

**FIELD SAMPLING INVESTIGATION PLAN
BUILDING 360 INDUSTRIAL WASTEWATER TREATMENT PLANT
AND SOUTHEAST CORNER OF BUILDING 5
ALAMEDA POINT
ALAMEDA, CALIFORNIA**

**Contract No. N62474-98-D-2076
Contract Task Order No. 0013, Modification 1**

Submitted to:

Department of the Navy
Southwest Division
Naval Facilities Engineering Command
Environmental Division
1220 Pacific Highway
San Diego, California 92132-5181

Submitted by:

IT Corporation
4005 Port Chicago Highway
Concord, California 94520-1120

Revision 0

August 2000

Issued to: Don Bader

Date: 8/14/00



Controlled



Uncontrolled

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August 2000

Approved By: Thomas A Davis Date: 8/10/00
Thomas A. Davis
Quality Control Manager

Approved By: Daniel Shafer for Date: 8/10/00
Daniel Shafer
Project Manager

***IT Corporation Response to Comments on the Draft Work Plan
Field Sampling Investigation Plan for the Building 360 Industrial Waste Treatment Plant
and the Former Underground Storage Tank 615-4 at the Southeast Corner of Building 5
Alameda Point, Alameda, California
August 2000***

<i>Comments by: Tetra Tech EM Inc.</i>				
Comment No.	Page No.	Section, Figure, Table	Comments	Response
1	Cover	General	Replace or remove the document description as a "Work Plan" in the binding, cover, and first tab and document cover pages of the binder. The binding and cover can be replaced with the word Project Plans and the tab and document cover pages should refer to the "Field Sampling and Investigation Plan".	The phrase "work plan" has been removed from the cover, spine, and document cover /signature pages. The first tab has been changed to read "Field Sampling Investigation Plan". Also, the title on the document cover/signature pages reads "Field Sampling Investigation Plan for the ..."
2	Page 1-1	Section 1.1	Please add the following cleanup goals here for each constituent for Building 5 Southeast corner: Clean up concentrations for metals should be at or below the established IR program background or the residential PRG (whichever is greater). The cleanup goal for total TPH will be 4,500 mg/kg. Please add these cleanup goals mentioned in the Sampling and Analysis Plan for IWTP 360.	The 3 rd bullet has been changed to read: "... Soil at UST 615-4 will be removed to a concentration of total TPH at or below 4,500 mg/kg. Additionally, due to the proximity of the former UST 615-4 location to sites where semivolatile organic compounds (SVOCs) are present in the soil; SVOCs will be analyzed for in the confirmation samples. A cleanup level for SVOCs; however, has not been established for Alameda Point."
3	Page 2-3	Section 2.3	The TPH concentration measured as gasoline is 230,000 mg/kg not 230 mg/kg.	Section 2.3, next to the last sentence: "230 mg/kg" has been changed to "230,000 mg/kg"
4	Page 3-1	Section 3	Regrading activities should take into account the closure plan requirements for Building 5 Southeast Corner which says that the excavation will be filled with tamped road base rock as a temporary measure until either overexcavation or final closure is achieved.	Section 3.0, 1 st paragraph, last sentence has been revised to read: "Confirmation samples will be collected from each sidewall, and the site will be backfilled with tamped road base rock as a temporary measure until either overexcavation or final closure is achieved."

Comments by: Tetra Tech EM Inc.

Comment No.	Page No.	Section, Figure, Table	Comments	Response
5	Page 3-1	Section 3	Add a sentence that mentions the notification of DTSC (Glenn Brown) of the removal actions and expected sampling dates at each site at least 7 to 10 working days before the event will occur.	Section 3.1, 2 nd paragraph, last sentence has been added to read: "Additionally, notification of removal actions and expected sampling dates for each site will be given to the DTSC (Glenn Brown) at least 7 to 10 working days before initiation of the field activities."
6	Page 3-3	Section 3.5	The concrete and asphalt disposal method/activities should be addressed. Suggest that a sentence is added at the end of the paragraph that says: "The concrete and asphalt removed during the excavations will be properly characterized and disposed of at the appropriate disposal facility."	Section 3.6 last sentence has been added to read: "The concrete and asphalt removed during the excavation s will be properly characterized and disposed at an appropriate disposal facility."
7	Page 3-4	Section 3.6.2	Fix the last sentence to include sampling for TPH-gasoline. Please note that SVOC should not be included at this time. The Navy is not completing SVOC analysis due to marsh crust.	Section 3.7.2 last sentence has been revised to read: "The samples will be collected in glass jars or brass sleeves and submitted for total TPH and SVOC analysis as described in the SAP."
8	Pages 3-5	Section 3.9	This section states that the excavations will be "... backfilled with clean fill and/or crushed rock, recontoured to original grade..." Please note Comment #4 above pertaining to the Building 5 Southeast closure plan.	Section 3.10, 2 nd paragraph has been added to read: "Following excavation activities at the former UST 615-4, commercially available, tamped road base rock will be used to fill the excavation as a temporary measure until either overexcavation or final closure is achieved."
9	Page 3-5	Section 3.9	The last paragraph mentions the extent of the excavation will be to the original data gap sampling locations. Please note the high concentration of TPH-gasoline reported (although qualifiers suggest this is not all gasoline) in the data gap sample collected at the eastern part of the excavation may require additional excavation if field observations indicate this is necessary.	Comment Noted. We will not base additional excavation decisions on field observations. Confirmation samples will be collected from locations which show visual impacts (if applicable) and the analytical results from those samples will be used as the basis for excavation recommendations, if appropriate.

Comments by: Tetra Tech EM Inc.

Comment No.	Page No.	Section, Figure, Table	Comments	Response
10	Page 3-6	Section 3.11	The second paragraph refers to the use of roll-off bins to stockpile soil generated during the excavation which is a deviation from the approved closure plan for Building 5 Southeast corner. Please note this deviation and address how the soil will be protected from rainwater infiltration. Per the closure plan, cover the soil with double black plastic and hold the plastic sheet using roped connected to sandbag weights will prevent rainwater infiltration.	Section 3.12, 2 nd paragraph has been revised to read: "The soil generated from excavation operations at the former UST 615-4 will be stockpiled on doubled black plastic sheeting on the concrete west of the site or in roll-off bins. If roll-off bins are used it should be noted that this is a deviation from the approved closure plan (Navy, 1998). For either soil stockpiling method, the soils will be covered with black plastic sheeting to prevent infiltration by rainwater. The plastic sheeting will be secured in-place by ropes connected to sandbag weights (or by other appropriate means)."
11	Page 3-7	Section 3.15	The project schedule does not allow for the completion of the third-party Professional Engineer certification by the September 29 th deadline. DTSC has requested the Navy to submit the Closure Reports by September 29 th . Additionally, the Field Investigation Report will be the closure report, therefore it should be named "Closure Summary Report" and will need to be completed at least one week before September 29, 2000 to allow a third-party certification to be completed by the deadline. Please note the Closure Summary Report should include information on all closure activities performed at the site.	Comment Noted.
12	NA	NA	Include a reference to the Building 5 Southeast Corner Closure Plan in the report.	A reference has been added throughout the text (Navy, 1998) and added to the reference section.
13	Page 2-2	Section 2.3	The first two paragraphs state that the storage areas at Building 5 was closed in 1988. Please change wording of both sentences to state that the drum dispensing operations were moved inside Building 5 in 1984 and the drum storage was relocated to a more protective area on the west side of Building 5.	Section 2.3, 1 st paragraph, 3 rd sentence revised to read: "... was used for storage of hazardous waste. The drum dispensing operation was transferred inside Building 5 in 1984, and drum storage was relocated west of Building 5 to a more protective area (Navy, 1998). Drummed waste stored in these areas ..."

***IT Corporation Response to Comments on the Draft Work Plan
Field Sampling Investigation Plan for the Building 360 Industrial Waste Treatment Plant
and the Former Underground Storage Tank 615-4 at the Southeast Corner of Building 5
Alameda Point, Alameda, California
August 2000***

Comments by: Greg Lorton transmitted via phone conversation with Sue Neishi (Navy) and Dan Shafer (IT)

Comment No.	Page No.	Section, Figure, Table	Comments	Response
1	General	General	Reference that the proposed work is a follow-on to the work documented in the IWTP 360 Closure Summary Report dated 9/25/97, and the Closure Certification Report for RCRA Permitted Facility Building 5 Southeast Corner (don't know date); and reference the Part A Permits assigned to each site.	Section 1.0, 3 rd paragraph added which reads: "The proposed work is a follow-up to work documented in the IWTP 360 Closure Summary Report (EEI, 1997), the Closure Certification Report for Resource Conservation and Recovery Act (RCRA) Permitted Facility Building 5 Southeast Corner (SSPORTS, undated), and the RCRA Part A Permits."

***Response to Comments on the Draft Sampling and Analysis Plan, For the Field Sampling Investigation Plan for the Building 360 Industrial Waste Treatment Plant and the Former Underground Storage Tank 615-4 at the Southeast Corner of Building 5, Alameda Point, Alameda, California
July 2000***

<i>Comments by: Tetra Tech EM Inc.</i>				
Comment No.	Page No.	Section, Figure, Table	Comments	Response
<i>Field Sampling Plan</i>				
1	Page 1-1	Section 1.0	Replace all references to the "...Resource Conservation and Recovery Act (RCRA) Part B permitted sites at Alameda Point..." with "...RCRA Part A permitted sites at Alameda Point...."	All references to RCRA Part B permitted sites have been revised to read RCRA Part A permitted sites.
2	Page 1-1	Section 1.1	Fix the second to last sentence in the paragraph to read as follows: The purpose of this FSP is to provide field sampling procedures and data gathering methods that will be used during <u>additional investigations at the RCRA units</u> .	The first sentence in the last paragraph of Section 1.1 has been revised to read as follows: "The purpose of this FSP is to provide field sampling procedures and data gathering methods that will be used during additional investigations at the RCRA units."
3	Page 2-1	Section 2.2	This section FSP states that the hazardous waste area at Building 5 Southeast Corner was closed in 1988. Please refer to Comment #13 in the FSIP comments section for guidance. Comment #13 in the FSIP comments section reads as follows: Please change wording of both sentences to state that the drum dispensing operations were moved inside Building 5 in 1984 and the drum storage was relocated to a more protective area on the west side of Building 5.	The statement as to Building 5 southeast corner closure has been deleted. The following sentence has been added as the last sentence in the first paragraph of Section 2.2. "The drum dispensing operations were moved inside Building 5 in 1984 and the drum storage was relocated to a more protective area on the west site of Building 5."
4	Page 4-1	Section 4.1	This section states that sampling for Building 360 will be done prior to excavation and these samples will serve as the confirmation samples. Please confirm with DTSC representative, Glenn Brown that this is acceptable for closure.	The Navy has conferred with Mr. Brown of DTSC who approves of the pre-removal confirmation sampling approach.

Comments by: Tetra Tech EM Inc.				
Comment No.	Page No.	Section, Figure, Table	Comments	Response
5	Page 4-2	Section 4.2	The FSP should be updated to reflect analysis of TPH as gasoline in the second bulleted item. In addition, the cleanup goal for total TPH is 4,500 mg/kg. Please note that the SVOC analysis should not be included at this time. See Comment #7 under the Field Sampling and Investigation Plan Comments section.	<p>TPH as gasoline has been added as a contaminant of possible concern for the former underground storage tank (UST) 615-4 removal action. Sections 4.2, 4.3.2, 4.3.3, 5.1, and 5.3.2, as well as Tables 1 and 2 have been revised to reflect this addition.</p> <p>The first sentence in the second paragraph of Section 4.2 has been revised to read as follows: "The cleanup goal for the former UST 615-4 site is 4,500 mg/kg for total TPH as diesel and motor oil."</p> <p>Due to the proximity of the additional removal at the former UST 615-4 location to other sites where SVOCs are a contaminant of concern, this analysis will be performed on the confirmation samples, unless otherwise instructed by the Navy and DTSC.</p>
6	Page 4-2	Section 4.3.1	This section states the IDW generated by the excavation activities will be stored onsite in roll-off-bins. Please note that storing the soil in the roll-off-bins is a deviation, however this is a better practice. Please note this deviation, cover the soil with a black plastic sheet, and make sure it is held down using ropes connected to sandbag weights to prevent rainwater infiltration.	IDW will be handled as discussed in Sections 3.10 and 3.11 of the Field Sampling Investigation Plan.
7	Pages 4-3 and 4-4	Sections 4.3.2 and 4.3.3	Sections 4.3.1 and 4.3.2, page 4-2 and 4-3: Allow for analysis of TPH as gasoline (see the third bulleted item).	Please see response to FSP comment number 5. Section and page numbers have changed due to the addition of concrete core IDW samples for Building 360.
8	Page 5-1	Section 5.1	Allow for analysis TPH as gasoline under the first bullet.	Please see response to FSP comment number 5.
9	Page 5-2	Section 5.3.2	The SVOC rinsate sample will not be applicable to the Southeast corner of Building 5 if Glenn does not require this analysis.	Please see response to FSP comment number 5.

Comments by: Tetra Tech EM Inc.

Comment No.	Page No.	Section, Figure, Table	Comments	Response
10	Page 6-4	Section 6.6	<p>Per Southeast Corner of Building 5's closure plan should include the following:</p> <ul style="list-style-type: none"> pH (for water samples and blanks) 	Water samples will be collected for waste disposal purposes only. pH is included as a parameter for these samples as described in Section 4.3.3. IT Corporation is unsure as to the proper section and page number reference given for this comment.
11	Pages 6-4 and 6-5	Section 6.7	<p>The following packaging requirements specified in the Southeast Corner of Building 5's Closure Plan are missing from the section (pay close attention to underlined areas):</p> <ul style="list-style-type: none"> <u>Individual sample containers will be wrapped in cushioning and placed in sealable plastic bags to minimize the potential for contamination.</u> The shipping containers will be partially filled with inert packing materials to protect the sample containers during shipment. The sample containers will be placed in the shipping container so as not to touch one another. <u>Wet ice, double packed in sealable plastic bags, or "blue" ice will be used to keep the samples cool during shipment. The ice will not be used as a substitute for packing materials.</u> <u>The remaining void space in the shipping container will be filled with inert packing materials.</u> 	Comment noted. The sample packaging and shipment requirements by IT Corporation (IT) are sufficient for all samples collected for any use. This section remains unchanged.
12	Page 6-5	Section 6.8.1	<p>Mention that the chain-of-custody (COC) procedures will follow the standard EPA protocol and the samples will be handled by a minimum number of personnel.</p>	Comment noted. The COC procedures followed by IT are sufficient for all samples collected for any use. This section remains unchanged.

Comments by: Tetra Tech EM Inc.

Comment No.	Page No.	Section, Figure, Table	Comments	Response
13	Page 6-6	Section 6.8.2	<p>Per the closure plan for the Southeast corner of Building 5 the logbook will provide sufficient data to reconstruct the events that occurred during the excavation at the Southeast corner of Building 5 (in the area UST 615-4). The following additional items should be included in the lists of minimum information required in the logbook for UST 615-4:</p> <ul style="list-style-type: none"> • Name (signature) of the person making the entry • Names of team members on-site • Level of personal protective equipment (PPE) employed, changes in PPE (if required) and reason(s) for changes. • Documentation of personnel collecting samples, preservative used (if any). • Brand, model number, and serial number of on-site monitoring equipment. • On-site measurement data (pH, temperature, PID readings, explosimeter/oxygen meter readings, etc. • Field observations and remarks, with sketches. • Log of photographs • Unusual circumstances or difficulties. • Initials of person making the entry. 	<p>Comment noted. IT utilizes two forms to document field activities. The field logbook is used to describe the collection of samples only while the field activity daily log is used for all other related field activities associated with the samples. This section remains unchanged.</p>
14	Not Applicable	Tables 1 and 2	<p>Table 1 Sample Containers, Preservatives, and Holding Times and Table 2 Summary Field Sampling and Analysis should include information for TPH as gasoline.</p>	<p>Please see response to FSP comment number 5.</p>

Comments by: Tetra Tech EM Inc.

Comment No.	Page No.	Section, Figure, Table	Comments	Response
<i>Quality Assurance Project Plan</i>				
15	Page 1-1	Section 1.0	Replace all references to the "...Resource Conservation and Recovery Act (RCRA) Part B permitted sites at Alameda Point..." with "...RCRA Part A permitted sites at Alameda Point..."	All references to RCRA Part B permitted sites have been revised to read RCRA Part A permitted sites.
16	Pages 3-2, 3-3, and 3-10	Sections 3.1.2, 3.1.3, and 3.4 Table 5	The TPH as gasoline needs to be addressed in these sections. Table 5 also needs to include the reporting limits for TPH as gasoline.	TPH as gasoline has not been added to the data quality objectives Sections 3.1.2 and 3.1.3 as cleanup goals for TPH as gasoline have not been established for this site. TPH as gasoline will however be analyzed in the soil confirmation samples collected at the former UST 615-4 site as described in Section 4.2 of the FSP. Section 3.4 and Table 5 have been revised to reflect the addition of this analysis.

***IT Corporation Response to Comments on the Draft Site Health and Safety Plan
Field Investigation Plan for Building 360 Industrial Wastewater Treatment Plant and Former UST 615-4
Alameda Point, Alameda, California
August 2000***

Comments by: Janet A. Corbett				
Comment No.	Page No.	Section, Figure, Table	Comments	Response
1 (a)	Cover Page		Ensure this page is signed in final plan.	The final document will include all required signatures.
2 (b)	5-1	Section 5.1.1	Where does the plan discuss the difference between Level D and Modified Level D?	A detailed discussion of Level D, and Modified Level D PPE is discussed in Section 5.1.1 of the Program Health and Safety Plan.
3 (c)	8-3	Section 8.2	Please add a section on calibration and maintenance of equipment	Air monitoring instruments, maintenance, and calibration are detailed in Section 8.0, "Air Monitoring," of the Program Health and Safety Plan.
4 (d)	11-2	Section 11.5	Please identify the evacuation routes and emergency meeting locations for the site at this time.	A site evacuation route for each EZ will be developed by the Site Safety Specialist prior to site activities. Wind direction, physical barriers, and other considerations must be included in the evacuation map.
5 (3)		Figure 12-1	Telephone number of medical treatment facility is not in service.	The correct telephone number has been provided.
6 (f)		Attachment 2	Telephone number of medical treatment facility is not in service. Please fill in the "TBD" section of the plan.	The form has been updated to provide all known contact numbers. Any remaining "TBD" information will be provided at the pre-constructions/mutual understanding meeting.



December 13, 2000

van shaver
IT Corporation

4005 Port Chicago Highway
Concord, CA 94520-1120
Tel. 925.288.9898
Fax. 925.288.0888

A Member of The IT Group

807181-ITNHO-1028

Ms. Melita Orpilla, Code 06BT.MO
BRAC Operations, Southwest Division
Naval Facilities Engineering Command
1230 Columbia Street, Suite 1100
San Diego, CA 92101

Attention: Ms. Sue Neishi, Code 06BU.SN, RPM
Contract: N62474-98-D-2076, Environmental Remedial Action Contract
Contract Task Order No.: CTO 13 - Modification 01
Subject: **Submittal of Replacement Pages**, Field Sampling Investigation Plan
(Site Health and Safety Plan section), Alameda Point, Alameda,
California

Dear Ms. Neishi:

Enclosed is one set of replacement pages for the Site Health and Safety Plan section of the *Field Sampling Investigation Plan for the Building 360 Industrial Wastewater Treatment Plant and Southeast Corner of Building 5*, Revision 0, August 2000. The replacement pages are being issued due, predominantly, to changes in IT and Navy staff. Since the excavation activities will be preformed soon at the Building 360 industrial wastewater treatment plant, the Site Health and Safety Plan needed to be updated accordingly to ensure the most current information is made available to those in the field during this project. With the exception of replacement pages issued due to grammatical changes, the following updates have been made:

- Sections 10.0 and 11.2, Attachment 2: IT's new Occupational Health Service is through Health Resources instead of Continuum
- Attachment 2: IT's new Program CIH is Fred Mlakar; the Site Health & Safety Specialist for this project has changed from Ian Langtry to Londell Allen; the new Navy ROICC has changed from Warren Yip to Peter Stroganoff

Upon receipt, please replace the pages currently in the Field Sampling Investigation Plan with the pages enclosed:

- Section 8.0 (Site Monitoring): Page 8-1
- Section 10.0 (Medical Surveillance Program): Page 10-1
- Section 11.0 (Emergency Response Plan and Contingency Procedures): Page 11-1
- Emergency Phone Numbers: Attachment 2
- Activity Hazard Analysis (Backfilling and Compaction): Attachment 3 (6th and 7th pages)
- Health and Safety Checklist: Attachment 5

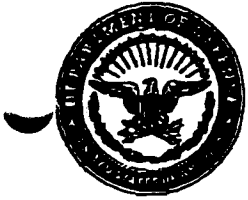
Should you have any questions, please contact the Project Manager, Daniel Shafer, at (916) 928-3399 ext. 345, or the undersigned at (925) 288-2212.

Sincerely,
IT CORPORATION

for Vince Hulsing
Daniel L. Shafer
Project Manager
CTO 13, Modification 01

Brenda L. Safreed
Brenda L. Safreed
Administrative Contract Manager
EFA-West PMO

cc: Mr. Steve Edde, Alameda Point Environmental Liaison
Mr. Randy Cate, Code 616CA.RC, EFA West
Mr. Peter Stroganoff, Code 612.PS, EFA West
Mr. Glenn Brown, DTSC
Project File



DEPARTMENT OF THE NAVY
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132-5190

11011
Ser 06KN.SN/649
11Aug 00

Mr. Glenn Brown
Department of Toxic Substances Control
700 Heinz Avenue, Suite 200
Berkeley, CA 94710-2721

Dear Mr. Brown,

The Naval Facilities Engineering Command, Southwest Division, is submitting the Field Sampling Investigation Plan for Industrial Wastewater Treatment Plant 360 and Southeast Corner of Building 5.

If you have any questions, please contact Steve Edde at (510) 749-5952 or Sue Neishi at (619) 532-0925

Sincerely,

SUE NEISHI
Base Realignment and Closure
Caretaker Project Leader

Enclosure: 1. Field Sampling Investigation Plan



August 14, 2000

IT Corporation

4005 Port Chicago Highway
Concord, CA 94520-1120
Tel. 925.288.9898
Fax. 925.288.0888

A Member of The IT Group

807181-ITNHO-1012-1

Ms. Melitta Orphilla, Code 06B2MO
Southwest Division
Naval Facilities Engineering Command
1230 Columbia Street, Suite 1100
San Diego, CA 92101

Attention: Ms. Sue Neishi, Code 06BU.SN, RPM
Contract: N62474-98-D-2076, Environmental Remedial Action Contract
Contract Task Order: 0013, Modification 01
Subject: Submittal of Project Plans, Alameda Point RCRA Removal Action, Alameda, California

Dear Ms. Orphilla:

Enclosed is one controlled copy of the Field Sampling Investigation Plan, Rev 0; Sampling and Analysis Plan for Field Sampling Investigation Plan, Rev 0; Site Health and Safety Plan for Field Sampling Investigation Plan, Rev 0; Construction Quality Control Plan for Field Sampling Investigation Plan, Rev 0, for the above-referenced project. IT is transmitting separate copies of these plans to the individuals listed below. These documents have been revised as required to reflect Navy comments. A summary of comments and responses is also included.

Should you have any questions, please do not hesitate to contact Mr. Daniel Shafer at 916-928-3399 ext. 345.

Sincerely,
IT CORPORATION

Daniel L. Shafer
Project Manager
CTO 0013, Mod. 01

Don Marini, P.E.
Deputy Program Manager
EFA-West PMO

Enclosures:

cc: Mr. Steve Edde, Alameda Point Environmental Liaison
Mr. Randy Cate, Code 616CA.RC, EFA West
Mr. Nars Ancog, Code 4EN3.NA, SWDiv
Ms. Jan Corbett, Code 071.JC, SWDiv
Mr. Warren Yip, Code 612.WY, EFA West
Ms. Tanzania Ivey, Tetra Tech EM Inc.
Mr. Glenn Brown, DTSC
Project File

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Figure 3	Underground Storage Tank 615-4 Detail Map

Acronyms and Abbreviations

BAAQMD	Bay Area Air Quality Management District
bgs	below ground surface
DTSC	Department of Toxic Substances Control
EEI	Ecology and Environmental, Inc.
FSP	Field Sampling Plan
ft	feet, foot
ID	inside diameter
IT	IT Corporation
IWTP	Industrial Wastewater Treatment Plant
mg/kg	milligrams per kilogram
NAS	Naval Air Station
NGVD29	National Geodetic Vertical Datum of 1929
PRG	Preliminary Remediation Goal
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
SHSP	Site Health and Safety Plan
SVOC	semivolatile organic compound(s)
TPH	total petroleum hydrocarbon(s)
UST	underground storage tank

1.0 Introduction

This Field Sampling Investigation Plan has been prepared for environmental investigations to be conducted at the Building 360 Industrial Wastewater Treatment Plant (IWTP) and the Former Underground Storage Tank (UST) 615-4 at the Southeast Corner of Building 5, located at Alameda Point in Alameda, California (Figure 1).

This investigation plan addresses procedures for field activities and technical decisions, and includes a Sampling and Analysis Plan (SAP). The SAP is comprised of two parts; Part I is the Field Sampling Plan (FSP) and Part II is the Quality Assurance Project Plan (QAPP). This investigation plan has been developed to be consistent with the closure plans, which have been approved by the Department of Toxic Substances Control (DTSC).

The proposed work is a follow-up to the work documented in the Ecology and Environmental, Inc. (EEI) IWTP 360 Closure Summary Report (1997), the Closure Certification Report for Resource Conservation and Recovery Act (RCRA) Permitted Facility Building 5 Southeast Corner (SSPORTS, undated), and the RCRA Part A Permits.

1.1 Purpose and Objectives

The purpose of this Field Sampling Investigation Plan is to provide detailed plans, procedures, and rationale in order to accomplish the following objectives:

- Investigate the extent of cadmium and total chromium contamination in the soil at IWTP 360
- Cleanup the affected soil at IWTP 360 to satisfy the RCRA closure requirements. In accordance with agreements between the Navy and DTSC, soil at IWTP 360 will be removed as necessary to achieve the established installation restoration program background levels for cadmium and total chromium or the California-modified residential preliminary remediation goals (PRGs) for cadmium of 9 milligrams per kilogram (mg/kg) and the U.S. Environmental Protection Agency Region 9 residential PRGs for total chromium of 210 mg/kg (EPA, 1999), whichever is greater. In this case, soil will be cleaned up to the residential PRGs.
- Cleanup soil at the former UST 615-4 that is affected with elevated concentrations of total petroleum hydrocarbons (TPH). Soil at UST 615-4 will be removed to achieve TPH concentrations reported as a total of diesel and motor oil, of 4,500 mg/kg or less. Additionally, because the former UST 615-4 location is near sites where semivolatile organic compounds (SVOCs) are present in the soil, the soil confirmation samples will be analyzed for SVOCs. A cleanup level for SVOCs, however, has not yet been established for Alameda Point.

- Achieve RCRA closure at IWTP 360 and UST 615-4

Procedures and guidance have been developed for the following tasks:

- Permitting, planning, and reporting
- Mobilization
- Utility clearances
- Concrete coring and sampling
- Concrete and asphalt removal
- Direct-push soil sampling methodology
- Sheet pile installation
- Soil excavation
- Soil disposal
- Surveying
- Equipment decontamination

The objective of this plan is to specify the methods that IT Corporation (IT) will use to collect and evaluate pre-excavation samples (IWTP 360) and confirmation samples (UST 615-4) and to perform necessary excavation activities to complete closure of the Building 360 IWTP and the former UST 615-4. These activities will be performed in accordance with the statutory requirements of the State of California.

1.2 Investigation Plan Organization

This plan is organized into the following sections:

- Section 1.0 – Introduction
 - Summarizes the purpose, objectives, and organization of the investigation plan
- Section 2.0 – Background
 - Provides a general site background, a site history, a brief description of current site conditions, and a summary of the results of the previous investigative activities that are applicable to the rationale for the investigative activities described in Section 3.0
- Section 3.0 – Field Sampling Investigative Activities
 - Presents the procedures for pre-excavation soil sampling, sheetpile installation, soil excavation, confirmation soil sampling, and investigation-derived waste and excavated soil disposal
- Section 4.0 – References

- Presents a list of all the cited documents within the text and figures

Section 2.0 presents a brief site background and history, and the results of previous investigative activities conducted at the Building 360 IWTP and the former UST 615-4. This information forms the basis for the activities specified in the subsequent section.

2.0 Background

The following subsections present relevant background information and describe and summarize the results of previous investigations conducted at the Building 360 IWTP and the Former UST 615-4 (see Figure 1). The specific activities presented in this document are based on the background information presented in this section.

2.1 History of Naval Air Station Alameda and Alameda Point

The western and northwestern sections of Alameda were constructed by sequentially filling tidal flat and shallow water areas of the San Francisco Bay and the Oakland Estuary. The filling proceeded as industrial activity expanded on Alameda and on adjacent areas of Oakland, California.

The former Naval Air Station (NAS) Alameda, now renamed Alameda Point, is located on the western end of Alameda Island, south of Oakland, primarily in Alameda County, California. Alameda Island is separated from Oakland by the Oakland Inner Harbor, which was constructed during the late 1800s and early 1900s. Prior to this time, Alameda consisted of a peninsula surrounded by marsh and tidal areas. After construction of the Inner Harbor, fill was laid over the marsh, tidal areas, and open waters, primarily at the northern and western end of the island. Alameda Point is constructed on this fill material. The exact source of much of the fill material is undocumented, although dredge spoils from the nearby waterways were likely used for much of the fill material.

Numerous industries were present in the marsh and tidal areas of the Alameda Peninsula prior to and during various stages of filling in the mid- to late-1800s. Many of these industries were related to petroleum/coal storage and refining, natural gas manufacturing, and ship manufacturing. Chemicals detected at the subject facilities include metals, petroleum hydrocarbons, aromatic hydrocarbons, and polycyclic aromatic hydrocarbons.

2.2 Building 360 Industrial Wastewater Treatment Plant Description

Building 360 occupies approximately 4.5 acres of land. The building contained specialized production shops for the repair and testing of aircraft engines between 1954 and 1996. The building contained a paint shop, parts cleaning shop, and machine shops. Prior to 1975, plating wastes were discharged to the Seaplane Lagoon via the storm sewer system. After 1975, plating wastes were routed to an IWTP located west of Building 360 on the west side of Building 414.

The Building 360 IWTP has been out of operation since 1994 and all tanks, pumps, and piping have been emptied of all liquids (EEI, 1995).

The former Building 360 IWTP has two locations with elevated metals. One location, boring B3, has total chromium levels of 260 mg/kg in the soil at 10 feet below ground surface (bgs). The other location, boring B4, has cadmium levels of 10 mg/kg in the soil at 6 feet bgs. Both of these borings are adjacent to the cyanide and chromium sumps, respectively, which are filled with concrete.

2.3 Former Underground Storage Tank 615-4 at the Southeast Corner of Building 5

Building 5 occupies approximately 18.5 acres of land. Aircraft component repair and maintenance operations in Building 5 began in 1942 and included aircraft stripping and painting; cleaning, reworking, and manufacturing of metal parts; tool maintenance; and plating operations. One primary area located in Building 5 and in the southeast corner outside Building 5 was used for storage of hazardous waste. The drum dispensing operation was transferred inside Building 5 in 1984, and drum storage was relocated west of Building 5 to a more protective area (Navy, 1998). Drummed waste stored in these areas included spent solvent, waste paint, and waste oil.

The hazardous materials storage area located southeast of Building 5 was a paved site used to dispense light to heavy lubricating oils, hydraulic fluid, machine coolants, and chlorinated solvents from 55-gallon drums. The area was 52 feet long by 45 feet wide and provided storage for twenty-three 55-gallon drums. The drums were installed on racks located under an overhead roof. The hazardous materials storage area was converted to a storage area for non-hazardous materials following relocation of the drums and drum dispensing equipment in Building 5. Oil was removed through an oil/water separator (UST 615-3), and the wastewater was discharged to the industrial sewer. The removed oil was collected in UST 615-4. Underground storage tank 615-4 was an 80-gallon tank that was removed in 1998. The dimensions of the excavation were approximately 4 feet long by 3 feet wide.

Various contractors worked on the closure of UST 615-4; Tetra Tech EMI produced the closure report for the UST. One sample was taken at the bottom of the excavation and analyzed for TPH measured as gasoline, diesel, motor oil, and jet fuel and SVOCs. Total petroleum hydrocarbons measured as gasoline, diesel, and motor oil were detected at estimated concentrations of 6,100 mg/kg, 5,500 mg/kg, and 2,200 mg/kg, respectively. Semivolatile organic compounds were detected at levels above preliminary remediation goals and/or background levels for some

of the constituents. Based on the results, it was recommended that additional samples be collected in the area around the former UST to determine the extent of contamination.

In May 2000, Tetra Tech conducted data gap sampling at locations 4 feet north, east, and west of the original UST excavation limits at a depth of approximately 4 to 4.5 feet bgs, and at the border of the road directly south of the former UST also at a depth of 4 to 4.5 feet bgs. Samples were also planned at 6.5 feet bgs; however, groundwater was encountered above that depth. Total petroleum hydrocarbons were detected in all four samples; however, SVOCs were not detected. The maximum TPH concentrations were detected in sample GP-CA05-DG10-03 located on the east side of the excavation. Total petroleum hydrocarbons measured as gasoline and diesel were detected at 230,000 mg/kg and 1,200 mg/kg, respectively. Tetra Tech has indicated that that the elevated contamination levels were localized and did not extend past the sample boundary.

3.0 Field Sampling Investigative Activities

Based on the results presented in Sections 2.2 and 2.3, the following activities are proposed. For the Building 360 IWTP, approximately 3 concrete cores will be removed from the concrete slab and analyzed for disposal purposes, approximately 20 pre-excavation sample locations will be drilled using direct-push methods, and soil samples will be collected from each location at depths of 6 to 14 feet bgs (at 2-foot intervals) to determine the lateral and vertical extent required for the planned excavation (Figure 2). The excavation is expected to extend below the groundwater level; therefore, sheet piling may be installed to eliminate sloughing of the soil. Following excavation activities, the excavation will be backfilled with clean soil and/or crushed rock, regraded, compacted, and asphalted. For the former UST 615-4, the soil will be excavated to the limits determined from the Tetra Tech data gap sampling (Figure 3), which is approximately 4 feet beyond the limits of the original excavation to a depth of approximately 4.5 feet. Confirmation samples will be collected from each sidewall, and the site will be backfilled with tamped road base rock as a temporary measure until either overexcavation or final closure is achieved.

This section describes the activities to be performed and the methods to be used to collect pre-excavation soil samples, install sheet piling, and excavate impacted soil at the Building 360 IWTP; and to excavate impacted soil and collect confirmation samples at the former UST 615-4. The main activities include the following:

- Obtaining permits and providing notifications
- Mobilization
- Borehole location staking
- Utility clearances
- Concrete coring and sampling
- Concrete and asphalt demolition and removal
- Direct-push soil sampling methodology
- Sheet pile installation
- Soil excavation and disposal
- Soil dewatering
- Borehole abandonment
- Equipment decontamination
- Investigation-derived waste handling
- Demobilization
- Surveying

An FSP has been prepared and is presented as Part I of the SAP. The FSP details the procedures that IT will use for the collection, handling, labeling, and shipment of samples. Also included in the FSP is a discussion and identification of sampling quality control samples. In addition, the FSP addresses the management of investigation-derived wastes.

A project-specific QAPP has been prepared and is presented as Part II of the SAP. Additionally, a Site Health and Safety Plan (SHSP) has been prepared and submitted with this Field Sampling Investigation Plan.

3.1 Permits and Notifications

Permits for borings (direct-push sampling) will be obtained from the City of Alameda. IT Corporation will notify the Bay Area Air Quality Management District (BAAQMD) in writing five (5) working days prior to beginning the excavation of contaminated soil, as required by BAAQMD Regulation 8, Rule 40.

IT Corporation will also notify Underground Service Alert at least 48 hours prior to beginning drilling or excavation activities and will secure the appropriate authorizations from the Caretaker Site Office. IT Corporation will maintain these clearances and authorizations for the duration of the field work. Additionally, IT will notify DTSC (Glenn Brown) of removal actions and expected sampling dates for each site at least 7 to 10 working days before beginning the field activities.

3.2 Mobilization

Mobilization for the field activities will include procuring all necessary equipment and subcontractor services, designating a decontamination area, and conducting a preparatory-phase inspection. The preparatory-phase inspection will be held prior to mobilization to discuss project scope, health and safety requirements, soil sampling procedures, excavation procedures, status of submittals (such as permits) and procurements, and quality control protocols. In addition, mobilization will include designating an equipment staging area, a soil staging area, and a fluids staging area, and setting up an equipment decontamination area.

3.3 Boring Location Marking

The field superintendent (or designee) will complete pre-excavation boring location marking. Marking will consist of painting or staking the ground surface or pavement at the proposed boring location. The stake or ground marking will identify the boring by number. Marking will be done using either a permanent waterproof marker or paint.

3.4 Utility Clearances

Land surface utility clearances will be conducted to locate and avoid subsurface drilling and excavation hazards (e.g., utility lines) at each proposed pre-excavation soil sampling location and proposed excavation area. Prior to this, the existing utility and buried piping maps will be reviewed.

A minimum 10-foot radius will be surveyed for subsurface obstructions around the proposed location of each boring (i.e., each Geoprobe location) and over the entire area of the proposed excavations. The subcontractor will note each cleared sampling location with paint or with a stake immediately upon clearing it. All suspected underground utilities, conduits, and structures will be marked with color-coded marking paint according to standards established by the American Public Works Association. If utilities or other obstructions or hazards are identified at any location, the IT field representative will identify a new location to be surveyed (the boring will be repositioned to avoid the hazard).

Surface geophysical methods that may be used include, but are not limited to, electromagnetic induction, geomagnetics, or a combination of these methods. Existing site utility maps will be used to the extent available prior to conducting clearance surveys. Anticipated utilities to be cleared include, but are not limited to, tanks; pipelines for natural gas, water, fuel, etc. (generally anything metallic); electrical lines; telephone or other transmission lines; drainage lines and sewers; foundations; and other structures.

3.5 Concrete Coring and Sampling

Concrete cores from the concrete slab located at the Building 360 IWTP site will be removed and sampled for disposal purposes. One concrete core will be collected for every 300 square feet of concrete area (approximately 3 cores) as required by DTSC (1994). Concrete core locations will be biased to areas where contamination occurred or was most likely to have occurred. The top 1 inch of each core will be removed and analyzed for the California Assessment Manual 17 metals and reactive cyanide as described in the SAP. The results will be compared to requirements set forth in 40 Code of Federal Regulations 261.24(b) and Title 22 Code of California Regulations 66261.2 for disposal purposes.

3.6 Concrete and Asphalt Demolition and Removal

Prior to pre-sampling and excavation activities at the Building 360 IWTP, it will be necessary to demolish and remove a concrete slab that is situated adjacent to the cyanide and chromium sumps. The two boring locations of interest (B3 and B4) are located next to the chromium and

cyanide sumps, respectively, which are filled-in with concrete. Each sump is approximately 3 to 4 feet in diameter and 6 feet tall. The concrete slab is located approximately 3 feet north of the sumps and is approximately 30 feet long by 24 feet wide. Most of the proposed boring sites at the Building 360 IWTP, and excavations at both the Building 360 IWTP and former UST 615-4, are covered with either concrete or asphalt pavement that will require removal before excavation can occur. The concrete and asphalt removed during the excavation will be properly characterized and disposed of at an appropriate disposal facility.

3.7 Direct-Push Method Sampling

The direct-push sampling method will be used to collect pre-excavation and confirmation soil samples at IWTP 360. The method uses primarily the weight of the sampling vehicle to push the sampling tools into the soil. Once the required sampling depth is reached, the sampler will be retrieved and the soil sample removed. Sample collection requires a 1-1/2-inch inside diameter (ID) probe (minimum) be used to obtain soil samples (e.g., Geoprobe or Macroprobe).

3.7.1 Pre-excavation Samples

Prior to excavation activities, twenty (20) pre-excavation sampling locations have been identified for the collection of soil samples for cadmium and total chromium analysis at the Building 360 IWTP. Five soil samples will be collected from each sampling location at the Building 360 IWTP. The samples will consist of subsurface soil collected at approximately 6 feet, 8 feet, 10 feet, 12 feet, and 14 feet bgs. Soil will be collected in 48-inch long lexan or acetate liners. The liner will be cut at the depth of interest, and both ends of the tube will be sealed with Teflon tape and capped with plastic caps. The samples will be submitted for total chromium and cadmium analysis as described in the SAP.

3.7.2 Confirmation Samples

No confirmation samples will be collected at the Building 360 IWTP because the pre-excavation samples will serve that purpose. Confirmation samples are not planned for IWTP 360 because the anticipated excavation below the groundwater table will create the need for piling or shoring that is likely to prevent adequate collection of a confirmation sample. At the former UST 615-4 at the southeast corner of Building 5, one sample will be collected from each side wall at approximately 0.5 feet above the groundwater level (groundwater is found at approximately 5 feet bgs). The samples will be collected in glass jars or brass sleeves and submitted for TPH as gasoline, diesel, and motor oil, and SVOC analysis as described in the SAP.

3.8 Boring Abandonment

All direct-push borings will be grouted to the surface with 5 percent bentonite-cement slurry. Grout will be placed via a tremie set at the bottom of the hole. The grout will be allowed to settle a minimum of 24 hours, then checked and topped off if required.

3.9 Sheetpile Installation

Due to the depth of excavation (approximate maximum of 15 feet bgs) at the Building 360 IWTP, the proximity of Building 414, and the shallow groundwater table at the site, it may be necessary to install sheetpiling prior to performing excavation activities.

An IT Site Supervisor will serve as the designated person to observe and document all pile driving activity. Any obstructions encountered, other problems, and general observations of the driving of each section will be recorded and evaluated.

The sheetpile containment system will be installed as designed by the excavation subcontractor. IT Corporation will review the subcontractor's design. If obstructions prohibiting pile driving are encountered, offset locations may be selected and attempted. The sheetpile will follow the most constructable alignment that field conditions allow.

The actual machinery, equipment, and methodology to be used in the installation will be proposed by the subcontractor and approved by IT prior to beginning construction.

3.10 Soil Excavation and Removal

Soil excavation, removal, and disposal are planned at both the Building 360 IWTP and the former UST 615-4. Following excavation activities at the Building 360 IWTP, the excavations will be backfilled with clean fill and/or crushed rock, recontoured to original grade, and compacted. Areas that previously were covered by asphalt and/or concrete will be replaced.

Following excavation activities at the former UST 615-4, commercially available, tamped road base rock will be used to fill the excavation as a temporary measure until either overexcavation or final closure is achieved. Building 360 IWTP. The extent of excavation at the Building 360 IWTP will be based on the results of the pre-excavation sampling results. However, the maximum extent of the excavation is expected to be no greater than 20 feet long by 20 feet wide by approximately 15 feet deep.

Prior to excavation, sheet piling will be installed around the proposed excavation area as described in Section 3.8. During excavation activities, water that seeps into the excavation (due

to the depth of groundwater) will be pumped from the excavation into 55-gallon drums or holding tanks (or other appropriate containers) and held for sampling and proper shipment for disposal. If necessary, secondary containment will be installed around the drums/tanks. Following dewatering activities, one sample of the water will be collected and analyzed for waste disposal criteria.

Former UST 615-4

The proposed extent of excavation at the former UST 615-4 location is based on the results of data gap samples collected by TetraTech in May 2000. The depth of the excavation will not be extended below the surface of the groundwater table. The data gap samples were collected approximately 4 feet beyond the limits of the original approximately 4-foot long by 3-foot wide UST excavation. Results of that sampling event indicate low-level SVOC and TPH contaminants or non-detects. Therefore the excavation will extend to the confirmation samples.

3.11 Soil Dewatering

Due to the anticipated water content of the soil at the Building 360 IWTP, it may be necessary to dry the soil prior to disposal. The excavated soil may be placed in a drying cell, consisting of plastic sheeting and bermed sides, or shallow roll-off bins. The soil will be routinely aerated (physically turned over and mixed) to release the water from the soil. The water will be collected and pumped to the 55-gallon drums or tanks containing the excavation dewatering fluids for proper shipment for disposal.

3.12 Investigation-Derived Waste Handling

All cuttings and fluids that result from downhole operations will be placed in 55-gallon drums or roll-off containers (or other appropriate containers). All waste will be properly labeled, inventoried, contained, and managed.

The soil and water generated during excavation operations and soil dewatering at the Building 360 IWTP will be temporarily containerized as discussed in Sections 3.10 and 3.11. The soil generated from excavation operations at the former UST 615-4 will be stockpiled on doubled black plastic sheeting on the concrete west of the site or in roll-off bins. However, using roll-off bins would constitute a deviation from the approved closure plan (Navy, 1998). For either soil stockpiling methods, the soil will be covered with black plastic sheeting to prevent infiltration by rainwater. The plastic sheeting will be secured in-place by ropes connected to sandbag weights (or by other appropriate means).

At the conclusion of the field activities, all investigation-derived waste material and excavated soil will be sampled and analyzed as described in the SAP, and appropriately disposed of at an off-site facility.

3.13 Demobilization

All rental equipment will be decontaminated and removed from the site after the conclusion of work activities. Any government-owned equipment will undergo proper disposition according to the terms of the contract.

3.14 Surveying

Each pre-sampling and confirmation sampling location, and the four corners and center of each excavation, will be surveyed following sampling and excavation to properly locate sampling and excavation positions. All surveying will be completed under the supervision or direction of a State of California-certified land surveyor. Elevations for each point will be determined to the nearest 0.1 foot. The horizontal coordinates of each survey point will be determined to the nearest 1.0 foot and referenced to the California State Plane Coordinate System. Horizontal coordinates shall be based on the California State Plane Coordinate System, Zone III (NAD83.92), as published by the National Geodetic Survey. Elevations shall be based on the National Geodetic Vertical Datum of 1929 (NGVD29) as adjusted by the National Geodetic Survey in June 1991 and converted to NGVD29. If not already present, a minimum of one permanent control monument will be installed within a distance of 1,000 feet of each point to be surveyed.

3.15 Field Documentation

Field documentation will be prepared and maintained. Daily field activity logs documenting all field activities will be completed. All soil borings and excavations will be geologically logged in accordance with American Society for Testing and Materials Method D2488-93 *Description and Identification of Soils, Visual-Manual Procedure* (ASTM, 1993). Sampling will be documented as described in the SAP.

3.16 Project Schedule

The following major milestones of the schedule are as follows:

- Begin Mobilization – August 17, 2000
- Obtain pre-excavation Sample Results for Building 360 IWTP – August 25, 2000
- Complete Field Work – September 12, 2000
- Complete Field Sampling Investigation Reports (addenda to Closure Summary Reports)– September 29, 2000

4.0 References

American Society for Testing and Materials, 1993, Method D2488-93 *Description and Identification of Soils, Visual-Manual Procedure*, Philadelphia, PA.

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Ecology and Environmental, Inc., 1995, *Closure Plan, Industrial Wastewater Treatment Plant, Building 360, Naval Air Station Alameda, Alameda, California*, prepared for the U.S. Navy Public Works Center, San Francisco, CA.

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Navy Transition Office, 1998, Closure Plan for Hazardous Material Storage Area, Southeast Corner of Building 5, Alameda Point.

SSPORTS Environmental Detachment, undated, Closure Certification Report for Resource Conservation and Recovery Act (RCRA) Permitted Facility Building 5 Southeast Corner, Vallejo, CA.

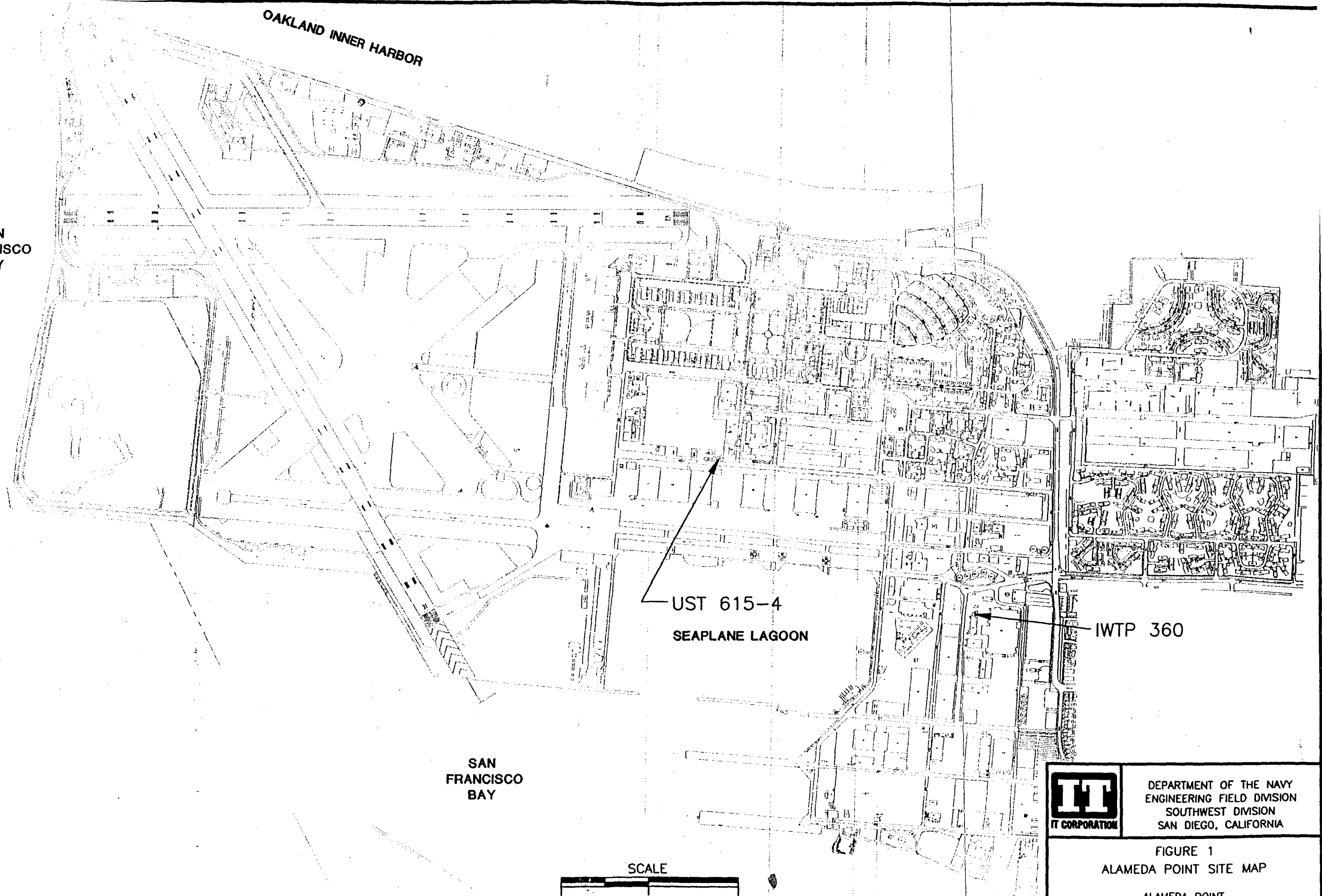
U.S. Environmental Protection Agency, 1999, *Region 9 Preliminary Remediation Goals (PRGs)*, San Francisco, CA.

FIGURES

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
---	ALABASE	CONCORD	SZ	7-27-00		807181-B3

SAN FRANCISCO BAY

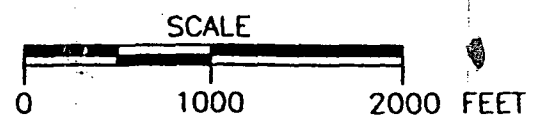
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UST 615-4
SEAPLANE LAGOON

IWTP 360

SAN FRANCISCO BAY

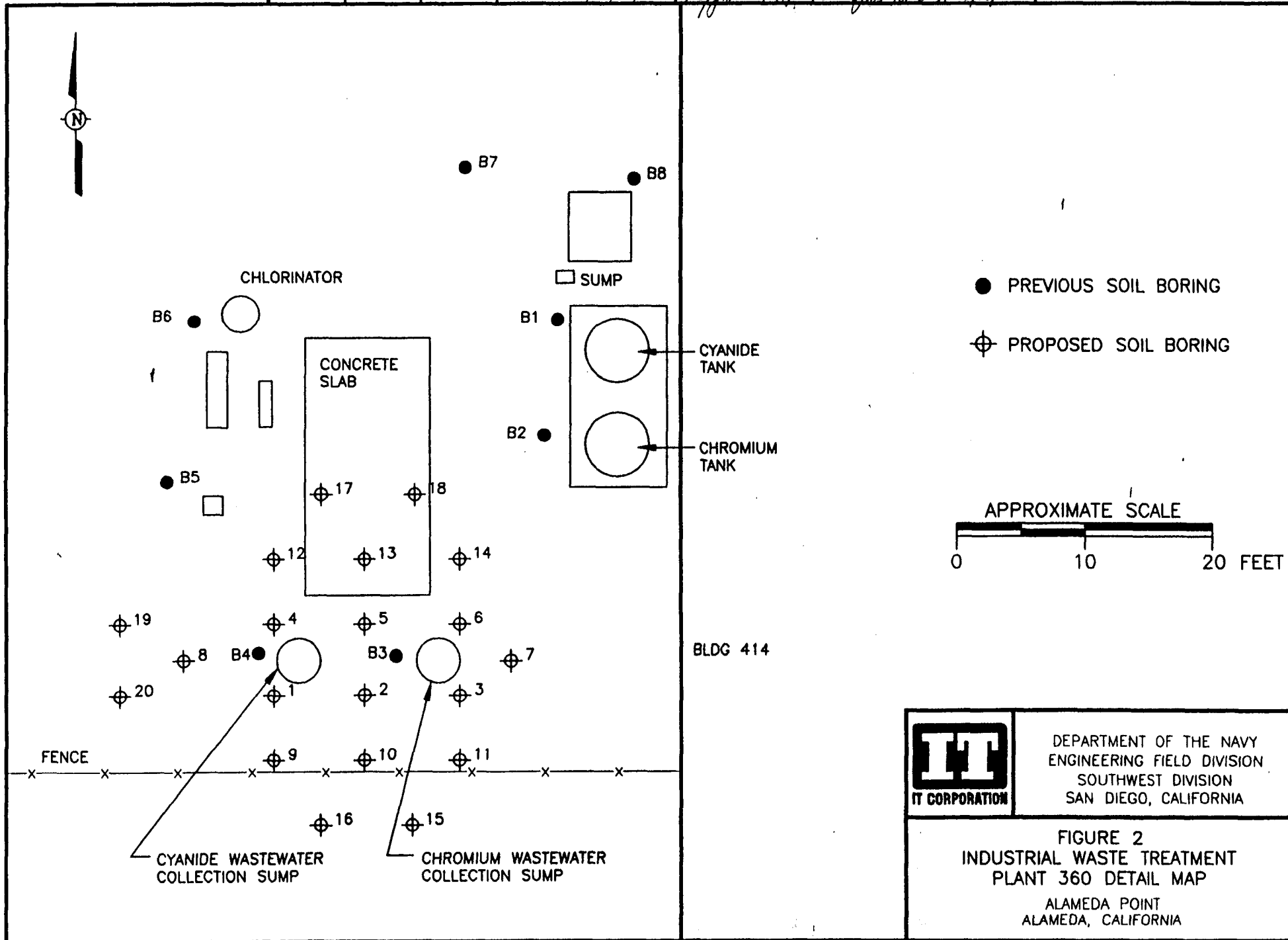


DEPARTMENT OF THE NAVY
ENGINEERING FIELD DIVISION
SOUTHWEST DIVISION
SAN DIEGO, CALIFORNIA

FIGURE 1
ALAMEDA POINT SITE MAP

ALAMEDA POINT
ALAMEDA, CALIFORNIA

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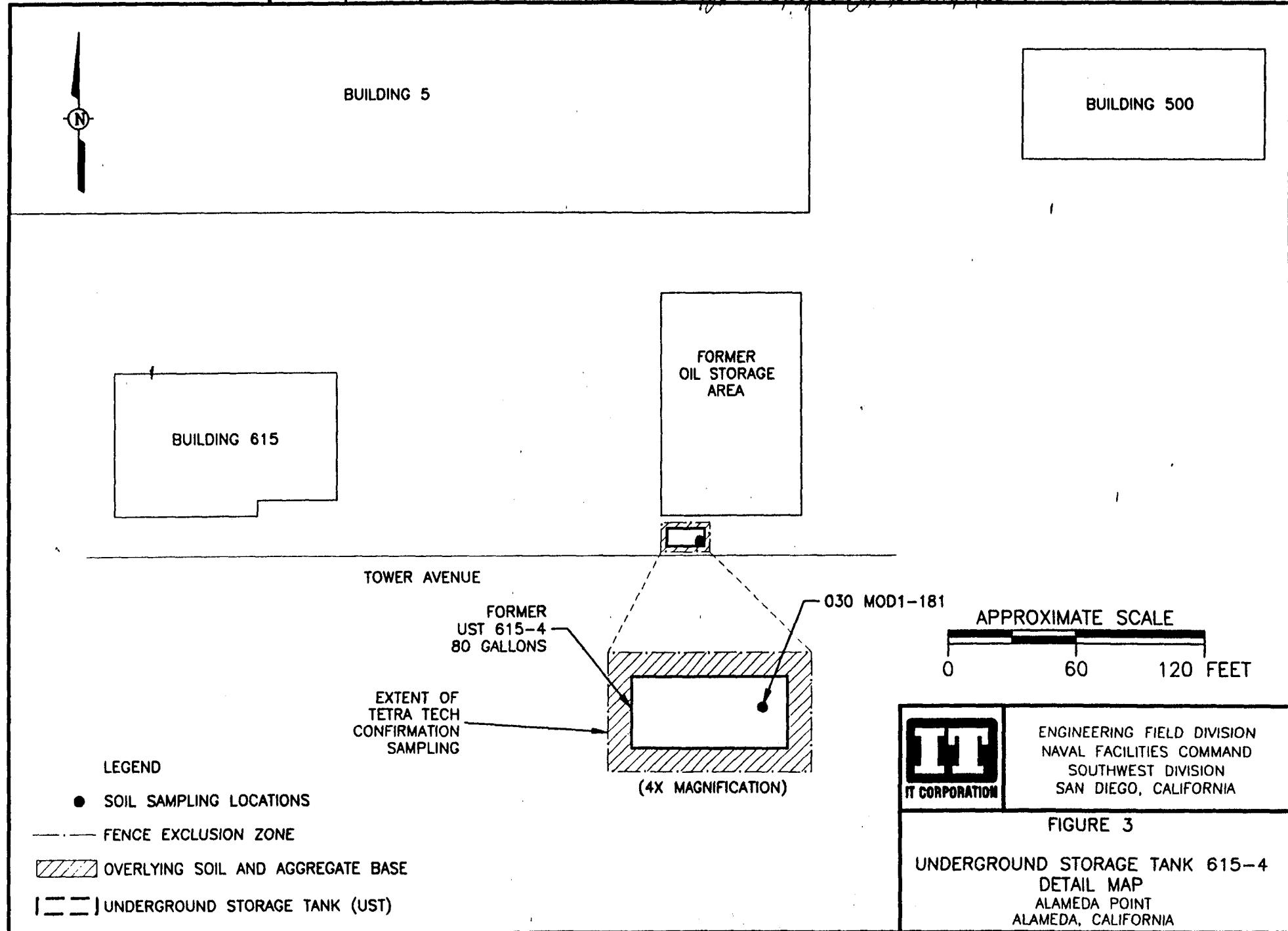
 ITT CORPORATION	DEPARTMENT OF THE NAVY ENGINEERING FIELD DIVISION SOUTHWEST DIVISION SAN DIEGO, CALIFORNIA
	FIGURE 2 INDUSTRIAL WASTE TREATMENT PLANT 360 DETAIL MAP ALAMEDA POINT ALAMEDA, CALIFORNIA

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**PROJECT QUALITY CONTROL PLAN
FOR THE FIELD SAMPLING INVESTIGATION PLAN
BUILDING 360 INDUSTRIAL WASTEWATER TREATMENT PLANT
AND SOUTHEAST CORNER OF BUILDING 5
ALAMEDA POINT
ALAMEDA, CALIFORNIA**

**Contract No. N62474-98-D-2076
Contract Task Order No. 0013, Modification 1**

Submitted to:

Department of the Navy
Southwest Division
Naval Facilities Engineering Command
1220 Pacific Highway
San Diego, California 92123-5187

Submitted by:

IT Corporation
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Revision 0

July 2000

Issued to: Don Baden

Date: 8/14/00



Controlled



Uncontrolled

**PROJECT QUALITY CONTROL PLAN
FOR THE FIELD SAMPLING INVESTIGATION PLAN
BUILDING 360 INDUSTRIAL WASTEWATER TREATMENT PLANT
AND SOUTHEAST CORNER OF BUILDING 5
ALAMEDA POINT
ALAMEDA, CALIFORNIA**

**Contract No. N62474-98-D-2076
Contract Task Order No. 0013, Modification 1**

Revision 0

July 2000

Approved by: Thomas A. Davis
Thomas A. Davis
IT Program Quality Control Manager

Date: 8/10/00

Approved by: Jim Gray for
Daniel Shafer
IT Project Manager

Date: 8/10/00

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Appendix B	Alternate Project QC Manager Letter of Designation
Appendix C	QC Organization Chart
Appendix D	Definable Features of Work Matrix
Appendix E	Testing Plan and Log
Appendix F	Submittal Register

Acronyms and Abbreviations

IT	IT Corporation
IWTP	Industrial Waste Treatment Plant
PQCP	Project Quality Control Plan
QC	Quality Control
QCPP	Quality Control Program Plan
SOP	Standard Operating Procedures
SQP	Standard Quality Procedures
UST	underground storage tank

1.0 Introduction

This Project Quality Control Plan (PQCP) has been prepared to describe the quality control (QC) actions that IT Corporation (IT) will implement during the Field Sampling Investigation at IWTP 360 and UST 615-4. This work is being performed under CTO 0013, Mod 1.

This PQCP will be used in conjunction with the Draft Quality Control Program Plan (QCPP) that IT has prepared for work under Remedial Action Contract No. N62474-98-D-2076, and with IT Standard Quality Procedures (SQP)/Standard Operating Procedures (SOP), as applicable.

Section 2.0 of this PQCP describes the portions of the QCPP that are applicable to this project and any site-specific modifications to the QCPP that are required. Section 3.0 of this PQCP lists the IT SQPs and SOPs that are applicable. Appendices A through F present the following supporting documentation for the site-specific QC activities that IT will perform throughout the execution of this project:

- Appendix A, Project QC Manager Letter of Designation
- Appendix B, Alternate Project QC Manager Letter of Designation
- Appendix C, QC Organization Chart
- Appendix D, Definable Features of Work Matrix
- Appendix E, Testing Plan and Log
- Appendix F, Submittal Register

2.0 Quality Control Program Plan

The following portions of the QCPP are applicable to the work conducted under this project, with modifications as noted:

- Management Policy Statement: applicable in its entirety
- Section 1.0 - Introduction: applicable in its entirety
- Section-2.0 - Organization and Responsibilities: applicable with the following modifications:
 - Add to Section 2.0 The QC organization will be as shown in Figure 1, “Quality Control Organization Chart,” presented in Appendix C
- Section 3.0 - Quality Control Management: applicable in its entirety
- Section 4.0 - Personnel Training and Qualification: applicable in its entirety
- Section 5.0 - Instructions, Procedures, and Drawings: applicable in its entirety
- Section 6.0 - Document Control: applicable in its entirety
- Section 7.0 - Procurement: applicable in its entirety
- Section 8.0 - Chemical Data Quality: applicable in its entirety
- Section 9.0 - Field Sampling: applicable as described in the Sampling and Analysis Plan
- Section 10.0 - Laboratory Analysis: applicable as described in the Sampling and Analysis Plan
- Section 11.0 - Report Preparation: applicable in its entirety
- Section 12.0 - Review of Work Activities: applicable in its entirety
- Section 13.0 - Inspections: applicable in its entirety
- Section 14.0 - Calibration and Maintenance of Measuring and Test Equipment: applicable in its entirety
- Section 15.0 - Test Control: applicable in its entirety
- Section 16.0 - Nonconformance Control and Corrective Actions: applicable in its entirety
- Section 17.0 - Change Control: applicable in its entirety

- Section 18.0 - Audits and Surveillance: applicable with the following modification: Subsections 18.1 through 18.8 do not apply
- Section 19.0 - Records Management: applicable in its entirety

3.0 Procedures

3.1 Standard Quality Procedures

The following IT SQPs have been determined to be applicable to this project:

- SQP 1.1 - Contractor Quality Control Program
- SQP 3.2 - Indoctrination and Training
- SQP 4.1 - Document Control
- SQP 4.2 - Records Management
- SQP 5.1 - Preparation, Revision, and Approval of Plans and Procedures
- SQP 6.1 - Preparation, Review, and Approval of Procurement Documents
- SQP 7.1 - Quality Inspections and Inspection Records
- SQP 7.2 - Receipt Inspection
- SQP 8.2 - Calibration and Maintenance of Measuring and Test Equipment
- SQP 10.1 - Nonconformance Control
- SQP 10.2 - Corrective Action
- SQP 10.3 - Stop Work Order
- SQP 11.1 - Field Work Variance/Request For Information
- SQP 12.1 - Quality Audits
- SQP 12.2 - Management Assessment
- SQP 12.3 - Quality Surveillances
- SQP 13.1 - Coordination of Subcontracted Analytical Laboratories

3.2 Standard Operating Procedures

The following IT SOPs have been determined to be applicable to this project:

- SOP 1.1 - Chain of Custody
- SOP 2.1 - Sample Handling, Packaging, and Shipping
- SOP 3.1 - Surface and Shallow Subsurface Soil Sampling
- SOP 5.1 - Water Level Measurements in Monitoring Wells
- SOP 6.1 - Sampling Equipment and Well Material Decontamination
- SOP 6.2 - Drilling and Heavy Equipment Decontamination
- SOP 7.1 - Surface and Subsurface Geophysics
- SOP 8.1 - Monitoring Well Installation
- SOP 8.2 - Monitoring Well Development
- SOP 10.2 - Cone Penetration Testing and Hydropunch Groundwater Sampling
- SOP 12.1 - Soil Stockpiling
- SOP 13.1 - Indoor Air Quality Sampling Using Summa Canisters
- SOP 17.1 - Sample Labeling

- SOP 17.2 - Sample Numbering
- SOP 18.1 - Field QC Sampling
- SOP 19.1 - On-Site Sample Storage
- SOP 23.1 - Land Surveying

APPENDIX A
PROJECT QC MANAGER LETTER OF DESIGNATION

ALAMEDA POINT
FIELD SAMPLING INVESTIGATION
CONTRACT TASK ORDER 0013, MOD 1

PROJECT QC MANAGER
LETTER OF DESIGNATION

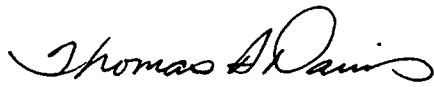
JULY 28, 2000

Mr. Charles Holman,

This letter will serve to assign you as IT Corporation's (IT) site Project Quality Control (QC) Manager for the above captioned contract task order. In the case where you are not able to perform the Project QC Manager's duties, Mr. Eric Watabayashi will serve as your Alternate Project QC Manager. In the role of Project QC Manager you have the responsibilities and authorities designated in section 2.1.3 of the Draft Quality Control Program Plan (QCPP). Additionally, you are granted stop work authority and will exercise this authority consistent with the Draft QCPP, section 16.4 and Standard Quality Procedures (SQP) 10.3. You are granted the authority to approve IT-approved submittals which have been certified by qualified submittal reviewers, as identified in the QC Organization Chart for this contract task order, to ensure the quality of the work, and to direct the removal and/or replacement of nonconforming materials or work. In this capacity you will report directly to me and will administer the established requirements of the contract task order Project QC Plan.

If you have any questions or require additional information, please contact me at (925) 288-2086.

Sincerely,
IT CORPORATION



Thomas A. Davis
Program QC Manager

APPENDIX B
ALTERNATE PROJECT QC MANAGER LETTER OF DESIGNATION

ALAMEDA POINT
FIELD SAMPLING INVESTIGATION
CONTRACT TASK ORDER 0013, MOD 1

ALTERNATE PROJECT QC MANAGER
LETTER OF DESIGNATION

JULY 28, 2000

Mr. Eric Watabayashi,

This letter will serve to assign you as IT Corporation's (IT) Alternate Project Quality Control (QC) Manager for the above captioned contract task order. In the case where the designated Project QC Manager, Mr. Charles Holman, is unable to perform the Project QC Manager's duties, you will serve in that capacity. In this role, you will have the responsibilities and authorities designated in section 2.1.3 of the Draft Quality Control Program Plan (QCPP). Additionally, you will have stop work authority and will exercise this authority consistent with the Draft QCPP, section 16.4 and Standard Quality Procedures (SQP) 10.3. You are granted the authority to approve IT-approved submittals which have been certified by qualified submittal reviewers, as identified on the QC Organization Chart for this contract task order, to ensure the quality of the work, and to direct the removal and/or replacement of nonconforming materials or work. You will be authorized to act as an alternate for 14 consecutive working days or 30 non-consecutive working days at a maximum. You will report directly to me and will administer the established requirements of the contract task order Project QC Plan.

If you have any questions or require additional information, please contact me at (925) 288-2086.

Sincerely,
IT CORPORATION

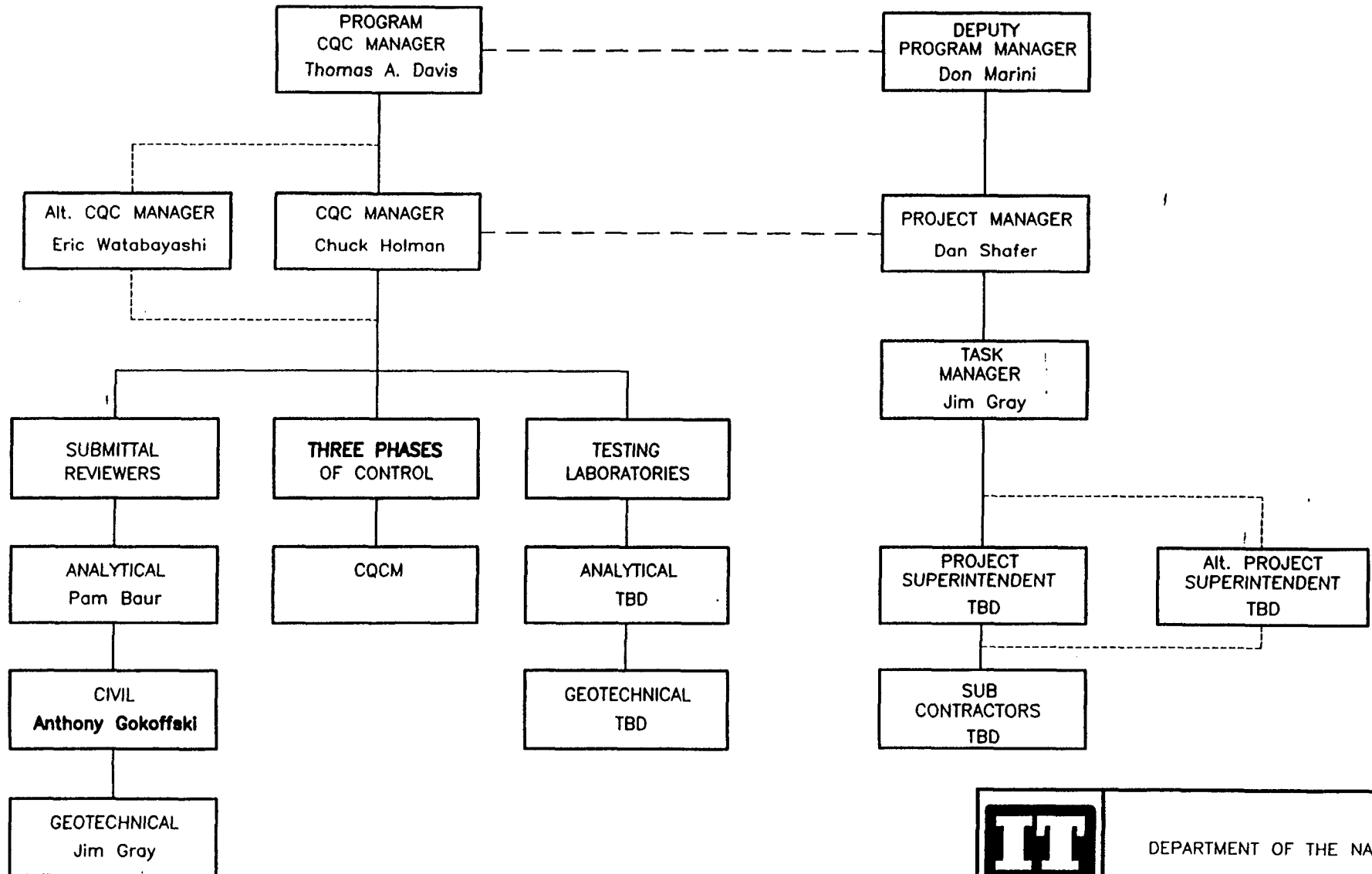


Thomas A. Davis
Program QC Manager

APPENDIX C

QC ORGANIZATION CHART

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	Concord	SJZ 7/26/00	<i>[Signature]</i> 8/10/00	<i>[Signature]</i> 8/10/00	807181-A3



DEPARTMENT OF THE NAVY

FIGURE 1
QUALITY CONTROL ORGANIZATIONAL CHART
 FIELD SAMPLING INVESTIGATION AT BUILDING
 360 IWTP, FORMER UST 615-4
 CONTRACT TASK ORDER 13, MOD 1
 ALAMEDA POINT, CALIFORNIA

APPENDIX D
DEFINABLE FEATURES OF WORK MATRIX

PROJECT QUALITY CONTROL PLAN
Alameda Point, Field Sampling Investigation
Alameda, California
Contract Task Order No. 0013, Mod. 1

DEFINABLE FEATURES OF WORK MATRIX

Specification Section	Paragraph No.	Feature of Work	Prep		Initial		Follow up	Remarks
			Req	Date	Req	Date	Req	
Investigation Plan	3.4	Geophysical Survey	X		X		X	
Investigation Plan	3.7	Direct Push Sampling	X		X		X	
Investigation Plan	3.9	Sheet Pile Installation	X		X		X	
Investigation Plan	3.5, 3.10	Excavation and Soil Handling	X		X		X	
Investigation Plan	3.12, 3.11	Waste Water Management	X		X		X	
Investigation Plan	3.13	Backfill/Site Restoration	X		X		X	

SAP denotes Sampling and Analysis Plan.

APPENDIX E TESTING PLAN AND LOG

TESTING PLAN AND LOG

Contract No. N62474-98-D-2076 Contract Task Order No. 0013, Mod. 1			PROJECT TITLE AND LOCATION Alameda Point, Field Sampling Investigation					CONTRACTOR IT Corporation			
SPECIFICATION SECTION AND PARAGRAPH NUMBER	TEST PROCEDURE	TEST NAME	ACCREDITED/ APPROVED LAB		SAMPLED BY	LOCATION OF TEST		FREQUENCY OF TEST	DATE COMPLETE	DATE FORWARDED TO CONTR, OFF	REMARKS
			YES	NO		ON SITE	OFF SITE				
**											

*** No testing activities have been identified for field activities under this CTO*

**APPENDIX F
SUBMITTAL REGISTER**

SUBMITTAL REGISTER																							CONTRACT NO. N62474-98-D-2076 CTO. No. 0013, Mod 1			
TITLE AND LOCATION: Alameda Point, Field sampling Investigation, CTO 0013, Mod. 1, Alameda California														CONTRACTOR IT Corporation									SPECIFICATION SECTION Base Contract			
TRANS- MITTAL NO. a	ITEM NO. b	SPECIFICATION PARAGRAPH NO. c	DESCRIPTION OF ITEM SUBMITTED d	TYPE OF SUBMITTAL								CLASSI- FICATION		RE- VIEW E R p	CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS ⁽¹⁾ y			
				D A T A e	D R A W I N G S f	I N S T R U C T I O N S g	S C H E D U L E S h	S T A T E M E N T S i	R E P O R T S j	C E R T I F I C A T E S k	S A M P L E S l	R E C O R D S m	I N F O R M A T I O N n		G O V A R N M E N T D o	SUB- MIT q	APPROVAL NEEDED BY r	MATERIAL NEEDED BY s	CODE t	DATE u	SUBMIT TO GOVERN- MENT v	CODE w		DATE x		
	001	6.3.1/6.7.1/7.3	Field Sampling Investigation Work Plan, QC Plan, and sampling and Analysis Plan, Rev B					X						X									7/27/00			
	002	6.3.1/6.7.1/7.3	Work Plan, QC Plan, and Sampling and Analysis Plan, Rev C					X						X									8/7/00			Not Applicable
	003	6.3.1/6.7.1/7.3	Work Plan, QC Plan, and Sampling and Analysis Plan, Rev 0					X						X									8/16/00			
	006	N/A	Field Sampling Investigation Report, Rev B					X						X									9/19/00			
	007	N/A	Field Sampling Investigation Report, Rev C					X						X									9/27/00			
	004	5.1/5.2/5.3.2	Site Health and Safety Plan, Rev B					X						X												
	005	5.1/5.2/5.3.2	Site Health and Safety Plan, Rev 0					X						X												

⁽¹⁾Days are based on a five-day work week.

**SAMPLING AND ANALYSIS PLAN
FOR THE FIELD SAMPLING INVESTIGATION PLAN
FOR THE BUILDING 360 INDUSTRIAL WASTE TREATMENT PLANT AND
THE SOUTHEAST CORNER OF BUILDING 5
ALAMEDA POINT
ALAMEDA, CALIFORNIA**

**Contract No. N62474-98-D-2076
Contract Task Order No. 0013, Modification 1**

Submitted to:

Department of the Navy
Southwest Division
Naval Facilities Engineering Command
Environmental Division
1220 Pacific Highway
San Diego, California 92132-5181

Submitted by:

IT Corporation
4005 Port Chicago Highway
Concord, California 94520-1120

Revision 0

August 2000

Issued to: Don Biden

Date: 8/14/00



Controlled



Uncontrolled

**SAMPLING AND ANALYSIS PLAN
FOR THE FIELD SAMPLING INVESTIGATION PLAN
FOR THE BUILDING 360 INDUSTRIAL WASTE TREATMENT PLANT AND
THE SOUTHEAST CORNER OF BUILDING 5
ALAMEDA POINT
ALAMEDA, CALIFORNIA**

**Contract No. N62474-98-D-2076
Contract Task Order No. 0013, Modification 1**

Revision 0

August 2000

Approved by: *Dan Shafer*
Dan Shafer
IT Project Manager

Date: 8/10/00

Approved by: *Emma P. Popek*
Emma Popek, Ph.D.
IT Program Chemist

Date: 8/10/00

Approved by: *Thomas A. Davis*
Thomas A. Davis
IT Program Quality Control Manager

Date: 8/10/00

Approved by: *See signature on the following page*
Nars Ancog
U.S. Navy Quality Assurance Officer

Date: _____

DRAFT
SAMPLING AND ANALYSIS PLAN
FOR THE FIELD SAMPLING INVESTIGATION PLAN
FOR THE BUILDING 360 INDUSTRIAL WASTE TREATMENT PLANT AND
THE FORMER UNDERGROUND STORAGE TANK 615-4 AT THE
SOUTHEAST CORNER OF BUILDING 5
ALAMEDA POINT
ALAMEDA, CALIFORNIA

Contract No. N62474-98-D-2076
Contract Task Order No. 0013, Modification 1

Revision B

July 2000

Approved by: _____
Dan Shafer
IT Project Manager

Date: _____

Approved by: Emma P. Popek
Emma Popek, Ph.D.
IT Program Chemist

Date: 7-28-00

Approved by: Thomas A. Davis
Thomas A. Davis
IT Program Quality Control Manager

Date: 7-28-00

Approved by: Nars Ancog
Nars Ancog
U.S. Navy Quality Assurance Officer

Date: 8/3/00

Master Table of Contents

Introduction

Part I Field Sampling Plan

Part II Quality Assurance Project Plan

Introduction

IT Corporation (IT) has prepared this Draft Sampling and Analysis Plan (SAP) to describe the field sampling and analysis that IT will perform during closure activities at two Resource Conservation and Recovery Act (RCRA) Part A-permitted sites at Alameda Point, Alameda, California. The project will entail soil excavations at Building 360 Industrial Waste Treatment Plant (IWTP) and Underground Storage Tank (UST) 615-4. This work will be conducted by IT under the Department of Navy Remedial Action Contract (RAC) No. N62474-98-D-2076, Contract Task Order (CTO) 0013.

This SAP consists of two parts: Part I, Field Sampling Plan (FSP) and Part II, Quality Assurance Project Plan (QAPP). The FSP guides all field data collection work by defining in detail the field sampling activities that the IT team will perform and the data gathering methods that the team will use. The FSP addresses the following issues:

- Frequency of sample collection and the sampling locations
- Number and purpose of samples to be taken
- Number and type of field QC samples
- Equipment decontamination procedures
- Disposal procedures for contaminated materials
- Analytical methods to be used
- Chain-of-custody procedures and field documentation
- Sample preservation, packaging, and shipment procedures

The QAPP defines the data quality objectives (DQOs), quality control (QC) and quality assurance (QA) activities, and procedures that the IT team, including subcontract laboratories, will follow to achieve project data quality goals. The quality-related issues are detailed in the following QAPP elements:

- Project management
- Measurement/data acquisition
- Assessment/oversight
- Data validation and usability

This SAP complies with the requirements of the following documents:

- U.S. Environmental Protection Agency (EPA), 1994, *Guidance for Data Quality Objectives Process, EPA QA/G-4*.
- Naval Facilities Engineering Command, 1999, *Navy Installation Restoration Chemical Data Quality Manual* (IR CDQM), September.
- U.S. Navy Southwest Division Naval Facilities Engineering Command, 1999, *Environmental Work Instruction 4EN.2*, October.
- IT Corporation, 1999, *Draft Quality Control Program Plan for Environmental Remedial Actions Contract No. N62474-98-D-2076*, November.

This SAP is a controlled document distributed by IT to all members of the project team. It is required reading for all staff participating in the data collection method, and it will be in the possession of the field teams and of the laboratories performing analytical work.

**FIELD SAMPLING PLAN
FOR THE FIELD SAMPLING INVESTIGATION PLAN
FOR THE BUILDING 360 INDUSTRIAL WASTE TREATMENT PLANT AND
SOUTHEAST CORNER OF BUILDING 5
ALAMEDA POINT
ALAMEDA, CALIFORNIA**

**Contract No. N62474-98-D-2076
Contract Task Order No. 0013, Modification 1**

Submitted to:

Department of the Navy
Southwest Division
Naval Facilities Engineering Command
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1220 Pacific Highway
San Diego, California 92132-5181

Submitted by:

IT Corporation
4005 Port Chicago Highway
Concord, California 94520-1120

Revision 0

August 2000

Issued to: Don Baden

Date: 8/14/00



Controlled



Uncontrolled

**FIELD SAMPLING PLAN
FOR THE FIELD SAMPLING INVESTIGATION PLAN
FOR THE BUILDING 360 INDUSTRIAL WASTE TREATMENT PLANT AND
SOUTHEAST CORNER OF BUILDING 5
ALAMEDA POINT
ALAMEDA, CALIFORNIA**

**Contract No. N62474-98-D-2076
Contract Task Order No. 0013, Modification 1**

Revision 0

August 2000

Approved by: *Dan Shafer*
Daniel Shafer
IT Project Manager

Date: 8/10/00

Approved by: *Emma P. Popek*
Emma Popek, Ph.D.
IT Program Chemist

Date: 8/10/00

Approved by: *Thomas A. Davis*
Thomas A. Davis
IT Program Quality Control Manager

Date: 8/10/00

Approved by: *See signature on the following page*
Nars Ancog
U.S. Navy Quality Assurance Officer

Date: _____

DRAFT
FIELD SAMPLING PLAN
FOR THE FIELD SAMPLING INVESTIGATION PLAN
FOR THE BUILDING 360 INDUSTRIAL WASTE TREATMENT PLANT AND
THE FORMER UNDERGROUND STORAGE TANK 615-4 AT THE
SOUTHEAST CORNER OF BUILDING 5
ALAMEDA POINT
ALAMEDA, CALIFORNIA

Contract No. N62474-98-D-2076
Contract Task Order No. 0013, Modification 1

Revision B

July 2000

Approved by: _____
Daniel Shafer
IT Project Manager

Date: _____

Approved by: Emma P. Popek
Emma Popek, Ph.D.
IT Program Chemist

Date: 7-28-00

Approved by: Thomas A. Davis
Thomas A. Davis
IT Program Quality Control Manager

Date: 7-28-00

Approved by: Nars Ancog
Nars Ancog
U.S. Navy Quality Assurance Officer

Date: 8/3/00

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Table 2 Summary of Field Sampling and Analysis

Acronyms and Abbreviations

bgs	below ground surface
CAM	California Assessment Manual
CCR	California Code of Regulations
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	Code of Federal Regulations
COC	chain-of-custody
CTO	Contract Task Order
DOT	Department of Transportation
DQO	data quality objectives
DTSC	Department of Toxic Substances Control
EPA	U.S. Environmental Protection Agency
EFA	Engineering Field Activity
FSP	Field Sampling Plan
IDW	investigation-derived waste
IT	IT Corporation
IWTP	Industrial Waste Treatment Plant
mL	milliliter
MS/MSD	matrix spike/matrix spike duplicate
QAPP	Quality Assurance Project Plan
QC	quality control
RAC	Remedial Action Contract
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
SOP	standard operating procedures
SOW	scope of work
STLC	soluble threshold limit concentration
SVOC	semivolatile organic compound
TCLP	toxicity characteristic leaching procedure
TPH	total petroleum hydrocarbon
TTLC	total threshold limit concentration
UST	underground storage tank
VOC	volatile organic compound
WET	waste extraction test

1.0 Introduction

IT Corporation (IT) has prepared this Field Sampling Plan (FSP) to describe the field sampling and analysis that IT will perform during closure activities at two Resource Conservation and Recovery Act (RCRA) Part A-permitted sites at Alameda Point, Alameda, California. The sites are Building 360 Industrial Waste Treatment Plant (IWTP) and the former Underground Storage Tank (UST) 615-4. This work will be conducted by IT under the Department of Navy Remedial Action Contract (RAC) Contract No. N62474-98-D-2076, Contract Task Order (CTO) 0013.

This FSP has been prepared as Part I of the Sampling and Analysis Plan (SAP). The project data quality objectives (DQOs) are presented in the Quality Assurance Project Plan (QAPP), which constitutes Part II of the SAP.

1.1 Scope and Purpose

The scope of work (SOW) for this project consists of the following tasks:

- Building 360 IWTP
 - Determining the vertical and lateral extent of contamination
 - Inserting sheet piles
 - Performing excavation of contaminated soil
 - Backfilling the excavated areas
- UST 615-4
 - Removal of total petroleum hydrocarbons (TPH)-contaminated soil
 - Confirmation sampling
 - Backfilling the excavated areas

The purpose of this FSP is to provide field sampling procedures and data gathering methods that will be used during additional investigations at the RCRA units. Field personnel will use this FSP as a reference during sampling activities.

1.2 Objective

The FSP has the following objectives:

- Providing a rationale for field sampling activities
- Describing the sampling strategy and design
- Describing and establishing consistent field sampling procedures

- Establishing data gathering, sample handling, and documentation methods that will be employed during field activities

The objective of the sampling and soil excavations is to obtain closure at the two RCRA sites, Building 360 IWTP, and former UST 615-4, thereby reducing future threats to public health and to the environment. Soil and wastewater will be sampled and analyzed to achieve the project objectives. Analytical data collected under the provisions of this FSP will be used for the following purposes:

- To determine the lateral and vertical extent of contamination prior to sheet piling placement and excavation activities at Building 360 IWTP
- To confirm that cleanup criteria were met following soil excavation at the former UST 615-4 location
- To properly dispose of investigation-derived waste (IDW)

2.0 Site History and Background

The following sections describe the Building 360 IWTP and former UST 615-4 areas. Their locations within Alameda Point are presented in Figure 1.

2.1 Building 360 Industrial Wastewater Treatment Plant

The Building 360 IWTP area is located west of Building 360 (Figure 2). Building 360 occupies approximately 4.5 acres of land. The building contained specialized production shops for the repair and testing of aircraft engines between 1954 and 1996. The building also contained a paint shop, parts cleaning shop, and machine shops. Prior to 1975, plating wastes were discharged to the Seaplane Lagoon via the storm sewer system. After 1975, plating wastes were routed to the IWTP.

2.2 Underground Storage Tank 615-4

The former UST 615-4 was used to contain oil from an oil/water separator located southeast of Building 5 in the hazardous waste storage area (Figure 3). Building 5 occupies approximately 18.5 acres of land. Aircraft component repair and maintenance operations in Building 5 began in 1942 and included aircraft overhang stripping and painting; cleaning, reworking, and manufacturing of metal parts; tool maintenance, plating; and paint operations. The hazardous waste area was located in the southeast corner outside Building 5. This area was used for dispensing of light to heavy lubricating oils, hydraulic fluid, machine coolants, and chlorinated solvents from 55-gallon drums. The area was 52 feet long by 45 feet wide and provided storage for 23 drums. The drum dispensing operations were moved inside Building 5 in 1984 and the drum storage was relocated to a more protective area on the west side of Building 5.

The former UST 615-4 located in the original dispensing area was an 80-gallon tank that was removed in 1998. The dimensions of the excavation were approximately 4 feet long by 3 feet wide and 5 to 6 feet deep.

3.0 Site Maps

Figure 1 presents Building 360 IWTP and the former UST 615-4 sites within Alameda Point. Figures 2 and 3 present the two individual sites.

4.0 Sampling Strategy

The project DQOs and sampling design are presented in Section 3.1 of the QAPP. This FSP section discusses the sampling and analysis strategy for soil, water, and IDW required to meet the project DQOs. Procedures for sample collection and handling are discussed in Sections 5.0 and 6.0, respectively.

The Standard Operating Procedures (SOPs) referenced in these sections are part of IT Standard Quality Procedures and Standard Operating Procedures Manual, October 1996.

4.1 Building 360 Industrial Waste Treatment Plant

Soil samples will be collected prior to sheet pile placement and excavation at the Building 360 IWTP area. Although the sampling is being performed prior to excavation, these soil samples will serve as excavation confirmation samples. To define the lateral and vertical extent of contamination, soil samples will be collected from approximately 6, 8, 10, 12, and 14 feet below ground surface (bgs) from each of 20 borings presented on Figure 2. Due to the time constraints on this effort, all 20 borings will be sampled; however, all samples will not necessarily be analyzed. Samples will be analyzed, as necessary, for cadmium and total chromium by EPA Method 6010B, as described below.

Samples from the inner eight locations will be analyzed first. If concentrations in the initial samples exceed the residential PRG concentrations, additional samples from the "step-out" locations will be analyzed as necessary to define the lateral and vertical extent. Sampling to the east of the sump area will be limited by an existing building located approximately 15 feet east of the chromium sump.

If these borings do not define cadmium and total chromium below the cleanup goals, the placement of contingent borings will be discussed with the Navy prior to additional work at this site. Cleanup goals are as follows:

- California-modified Residential Preliminary Remediation Goal (PRG) of 9 milligrams per kilogram (mg/kg) for cadmium
- EPA residential PRG of 210 mg/kg for total chromium

Once the contaminant area has been defined, sheet piles will be installed to reduce the potential sloughing of the saturated soils into the excavation. These sheet piles will represent the

excavation limits. After contaminated soil has been removed, the excavation pit will be backfilled with clean soil.

4.2 Underground Storage Tank 615-4 Soil Sampling

Following additional excavation at the former UST 615-4 site, as detailed in the Field Sampling Investigation Plan (IT, 2000), confirmation samples will be collected from the midpoint of each sidewall. The four sidewall samples will be collected approximately 0.5 feet above the bottom depth of the excavation and analyzed for the following parameters:

- Semivolatile organic compounds (SVOCs) by EPA Method 8270C
- TPH as gasoline by EPA Method 8015B
- TPH as gasoline, diesel, and motor oil by EPA Method 8015B following silica gel cleanup by EPA Method 3630C

The cleanup goal for the former UST 615-4 site is 4,500 mg/kg for total TPH as diesel and motor oil. If this goal is exceeded, additional removal may be warranted as approved by the Navy Remedial Project Manager. Although cleanup goals have not been established for SVOCs and TPH as gasoline at this site, these constituents are being analyzed as they have been detected during prior soil sampling activities. Any significant detected concentrations of these parameters will be brought to the Navy Remedial Project Manager's attention for further action, if necessary. Any further action required will be performed upon the Navy's approval.

4.3 Investigation-Derived Waste Streams

The project IDW will consist of the following streams:

- Concrete debris
- Excavated material as well as cuttings from soil borings
- Groundwater and decontamination water from soil removal below the water table and sampling activities

The final disposition of all waste will be determined within 90 days of the accumulation start date.

4.3.1 Concrete Debris

Concrete from the Building 360 IWTP will be removed and sampled for disposal purposes. One concrete core will be collected for every 300 square feet of area (approximately 3 samples) as required by Department of Toxic Substances Control (DTSC) *Permit Writer Instructions for*

Closure of Storage and Treatment Facilities (DTSC, 1993). Concrete core locations will be bias towards areas where contaminants occurred or was most likely to have occurred. The top 1-inch of each of the three concrete cores will be analyzed for the following parameters:

- California Assessment Manual (CAM) 17 metals by EPA Method 6010B/7000 series
- Reactive cyanide by EPA SW-846 Chapter 7

The concrete core results will be compared to requirements set forth in 40 Code of Federal Regulations (CFR) §261.24(b) and Title 22 Code of California Regulations (CCR) §66261.24 for disposal purposes.

4.3.2 Soil

Soil IDW generated from excavations and soil boring installations will be stored on site in roll-off bins. One 4-point composite sample will be collected from every 500 cubic yards of material produced. In order to determine the final disposition of soil IDW, each soil composite sample will be analyzed for the following parameters:

- Volatile organic compounds (VOCs) by EPA Method 8260B
- SVOCs by EPA Method 8270C
- TPH as gasoline, diesel, and motor oil by EPA Method 8015B
- CAM 17 metals by EPA Method 6010B/7000 series
- Oil and grease by EPA Method 418.1
- pH by EPA Method 9045C
- Ignitability by EPA Method 1010
- Reactivity by SW846 Chapter 7

Where total results for VOCs, SVOCs, or metals indicate possible leachable values above the 40 CFR §261.24(b) values, these parameters may be reanalyzed following the Toxicity Characteristic Leaching Procedure (TCLP) extraction. TCLP extraction will be conducted by EPA Method 1311. For metals exceeding the Title 22 CCR §66261.24 Total Threshold Limit Concentrations (TTLCs), a Waste Extraction Test (WET) extraction for Soluble Threshold Limit Concentration (STLC) metals may be required as described in CCR §66261.24. A 96-hour static acute fish bioassay may be required for increased levels of TPH as directed by the disposal facilities.

Soil IDW will be compared to the requirements set forth in 40 CFR §261.24(b) and Title 22 CCR §66261.24 for disposal purposes.

4.3.3 Water

Wastewater generated from groundwater and decontamination water will be stored in DOT-approved 55-gallon drums or a Baker tank. One sample from each of the sites representing the stream will be collected and analyzed for the following parameters to determine the appropriate disposal method:

- VOCs by EPA Method 8260B
- SVOCs by EPA Method 8270C
- TPH as gasoline, diesel, and motor oil by EPA Method 8015B
- Oil and grease by EPA Method 418.1
- CAM 17 metals by EPA Method 6010B/7000 series
- pH by EPA Method 9040B
- Ignitability by EPA Method 1010
- Reactivity by SW 846 Chapter 7

Wastewater IDW will be compared to the requirements set forth in 40 CFR §261.24(b) and Title 22 CCR §66261.24 for possible disposal or treatment purposes.

5.0 Analytical Requirements and Quality Control

This section describes analytical methods, container and preservative requirements, and field and laboratory quality control (QC) samples.

5.1 Analytical Methods

All other samples will be analyzed by SW-846 and other EPA methodologies where available. Following are the methodologies performed during this project.

- U.S. Environmental Protection Agency Test Methods for Evaluating Solid Waste, SW-846, Update III, 1996 will be used for the following:
 - VOCs by EPA Method 8260B
 - SVOCs by EPA Method 8270C
 - TPH as gasoline, diesel, and motor oil by EPA Method 8015B
 - Silica gel cleanup by EPA Method 3630C
 - CAM 17 metals by EPA Method 6010B/7000 series
 - pH by EPA Methods 9040B and 9045C
 - Reactivity by EPA SW846 Chapter 7
 - Ignitability by EPA Method 1010
 - Toxicity Characteristic Leaching Procedure (TCLP) by EPA Method 1311
- U.S. Environmental Protection Agency Methods for the Chemical Analysis of Water and Wastes, 1983 will be used for the following:
 - Oil and grease by EPA 418.1
- Miscellaneous Methods will be used for the following:
 - Waste Extraction Test (WET) by CCR Title 22

Detailed information on methods, calibration criteria, project required reporting limits, and QC acceptance criteria are presented in the QAPP.

5.2 Sample Containers, Preservatives, and Holding Times

Sample containers, preservation and holding time requirements will be according to IT SOP 20.1, and are summarized for this sampling event in Table 1. Sample containers for water will be certified pre-cleaned according to EPA protocols. If necessary, soil sample containers will be cleaned in the field as described in Section 6.4, and an equipment rinsate blank will be collected to verify that the cleaning procedure is adequate.

5.3 Field Quality Control Samples

Field QC samples will be collected and analyzed during the project to assess the consistency and performance of the sampling program. Field QC samples for this project will include field duplicates, equipment rinsate samples, and temperature blanks.

5.3.1 Field Duplicates

Field duplicates consist of two samples (a primary sample and a duplicate) of the same matrix collected at the same time and location to the extent possible, using the same sampling techniques. The purpose of field duplicate samples is to evaluate the precision of the overall sample collection and analysis process. Field duplicates will be collected for soil samples at a frequency of 1 per 10 samples and will be analyzed for the same parameters as the original sample. Field duplicates for soil boring samples will be vertically collocated, whereas a duplicate for the sidewall samples will be homogenized splits. Field duplicate samples will not be collected for IDW samples.

5.3.2 Equipment Rinsate Samples

Equipment rinsates samples will be collected for non-disposable sampling equipment, *i.e.*, Geoprobe® coring devices or hand augers. Rinsate samples consist of analyte-free water collected by pouring the water over or through the sampling device following the final rinse of the decontamination process. Rinsate samples will be collected from the sample equipment, placed in appropriate pre-cleaned containers supplied by the analytical laboratory, and analyzed for the following parameters:

- Cadmium and total chromium by EPA Method 6010B for IWTP Building 360 IWTP
- TPH as gasoline, diesel, and motor oil by EPA Method 8015B for UST 615-4
- SVOCs by EPA Method 8270C for UST 615-4

Equipment rinsate samples evaluate the effectiveness of the decontamination procedure and potential cross-contamination during sampling events. Equipment rinsate samples will be collected once at the end of the first day of sampling to verify the effectiveness of the decontamination procedure.

5.3.3 Temperature Blanks

Each cooler will be shipped with a temperature blank. A temperature blank is a sample container filled with tap water and stored in the cooler during sample collection and transportation. The

laboratory will record the temperature of the temperature blank immediately upon receipt of the samples.

5.4 Laboratory Quality Control Samples

The laboratory will analyze a matrix spike/matrix spike duplicate (MS/MSD) for every 20 project samples. In order for the laboratory to prepare a project-specific MS/MSD, field personnel will collect triple the sample volumes for water samples and, if necessary, additional volume for soil samples. Field personnel will designate 1 sample per every 20 for MS/MSD analysis on the chain-of-custody (COC) form.

5.5 Summary of Field Sampling and Analysis

Table 2 contains a summary of field sampling and analysis requirements for this project.

6.0 Field Methods and Sampling Procedures

6.1 Introduction

This section presents field sampling procedures and decontamination, sample handling, and documentation procedures.

6.2 Field Sampling Procedures

Field samples will be collected for soil and water samples according to the following procedures.

6.2.1 Soil Sampling Procedure

For the Building 360 IWTP area, soil samples will be collected using a continuous coring device such as the Geoprobe® as described in IT SOP 3.2, "Subsurface Soil Sampling While Drilling." For the former UST 615-4 site, soil samples will be collected using either a hand auger or core sampler with extensions, if necessary, as described in IT SOP 3.1, "Surface and Shallow Subsurface Sampling."

All non-disposable soil sampling equipment will be decontaminated before and after sampling according to the decontamination procedures outlined in Section 6.4.

The following steps summarize the sampling procedures to be performed for soil samples:

1. Obtain brass sleeves/acetate liners or 8-ounce glass jars.
2. Put on a new, clean, and chemical-resistant pair of disposable gloves.
3. Fill the sample sleeve or glass jar with soil using the Geoprobe® or coring device.
4. Cover both ends of sleeves/liners with the Teflon sheets and the plastic caps or cover jar with Teflon lined lid. Place a sample label, completed with the information described in Section 6.5, on the sleeve.
5. Use clear packing tape to secure sample label to container.
6. Place the sleeve in a resealable bag.
7. Place the sample in a cooler containing bagged ice.
8. Package and ship the samples in accordance with Section 6.6

6.2.2 Water Sampling Procedure

IDW wastewater will be collected using a disposable bailer as described in IT SOP 9.1. Samples will be collected as follows:

1. Obtain an unused disposable bailer for each water sample.
2. Put on a new, clean, and chemical-resistant pair of disposable gloves.
3. Tie the bailer to a nylon cord.
4. Lower the bailer into the monitoring well or tank/drum for IDW samples. Allow sufficient time for the bailer to fill with water.
5. Retrieve the bailer and fill appropriate bottle(s) for analyses being requested. For samples assigned for MS/MSD analyses only collect three sets of bottles. Groundwater samples for metals will be filtered through a 0.45-micron filter in the field prior to preservation.
6. Cap the bottle(s) and wipe any moisture from the outside of the bottle(s).
7. Place a sample label, completed with the information described in Section 6.5, on the bottle.
8. Place the bottle in a resealable bag.
9. Place the resealable bag containing the sample in a cooler with bagged ice for shipment to the analytical laboratory as described in Section 6.6.

6.3 Surveying

All sampling locations at the Building 360 IWTP and the former UST 615-4 site will be marked and surveyed according to IT SOP 23.1.

6.4 Decontamination Procedure

Decontamination of non-disposable sampling equipment that come in contact with samples will be performed according to IT SOP 6.1 to prevent the introduction of extraneous material into samples, and to prevent cross-contamination between samples. All sampling equipment will be decontaminated by steam cleaning or by washing with a nonphosphate detergent such as Liquinox™ or equivalent. Decontamination water will be collected in 55-DOT-approved drums or a Baker tank.

The following steps will be followed for decontamination of nondisposable sampling equipment:

1. Rinse with potable water. This step will decrease the gross contamination and reduce the frequency at which the nonphosphate detergent and water solution need to be changed.

2. Wash with the nonphosphate detergent and water solution using a long-handled brush. This step will remove remaining contamination from the equipment. The nonphosphate detergent will be diluted as directed by the manufacturer.
3. Rinse with potable water. This step will rinse the detergent solution away from the equipment. Change the water frequently.
4. Rinse with deionized water. This step will rinse any detergent solution and potable water residues. Rinsing will be done by applying the deionized water from a stainless steel Hudson-type sprayer or Nalgene™ squeeze bottle while holding equipment over a 5-gallon bucket.

Decontamination of drilling equipment will be done by hot water pressure washing according to IT SOP 6.2.

6.5 Sample Numbering

All soil samples submitted to the analytical laboratory will be uniquely numbered according to IT SOP 17.2 in the following format:

360-XX-YYY

615-4-XX-YYY

Where, “XX” denotes the purpose of sampling (“CS” for confirmation sample and “WP” for waste profiling) and “YYY” represents a sequential sample number for each site sample collected.

The sample number will be recorded in the field logbook at the time of sample collection. A complete description of the sample and sampling circumstances will be recorded in the bound Field Logbook and Field Daily Activity Log, and referenced to the unique sample identification number.

6.6 Sample Labeling

Sample labels will be filled out with indelible ink and affixed to each sample container. Each sample label will be covered with clear tape according to IT SOP 17.1. Sample containers will be placed in resealable plastic bags to protect the sample from moisture during transportation to the laboratory. Each sample container will be labeled with the following, at minimum:

1. Sample identification number
2. Sample collection date (month/day/year)
3. Time of collection (24-hour clock)

4. Project number (*i.e.*, 807181)
5. Sampler's initials
6. Analyses to be performed
7. Preservation (if any)
8. Location (*i.e.*, Alameda Point)
9. Client's name (*i.e.*, Navy)

6.7 Sample Packaging and Shipment

The shipping of samples to the analytical laboratory by land delivery services will be performed according to the DOT regulations. The International Air Transportation Association regulations will be adhered to when shipping samples by air courier services. Transportation methods will be selected to assure that the samples arrive at the laboratory in time to permit testing according to established holding times and project schedules. No samples will be accepted by the receiving laboratory without a properly prepared COC record and properly labeled and sealed shipping container(s).

Packaging of sample containers will be based on the level of protection a sample will require during handling, shipping, and storage. Protection may vary according to sample type, sample media, suspected amount of hazardous substances, required testing, and handling and storage conditions. Proper packaging will be based on the following considerations:

1. Type and composition of inner packing (*e.g.*, plastic bags, metal cans, absorbent packing material, and ice for preservation)
2. Type and composition of overpacks (*e.g.*, metal or plastic coolers, cardboard box, rock core box, and undisturbed tube rack)
3. Method of overpack sealing (*e.g.*, strapping tape, custody seals)
4. Marking and labeling of overpacks (*e.g.*, laboratory address, any appropriate DOT Hazard Class Labels, and handling instructions)

Samples will be handled according to IT SOP 2.1. Immediately after sample collection, sample labels will be affixed to each sample container. Each sample label will be covered with clear tape and the sample will be placed in a resealable plastic bag to keep the sample container and label dry. All glass sample containers will be protected with bubble wrap. A trip blank will be maintained with every cooler containing water VOC samples. A temperature blank will be placed in every cooler with samples.

Samples to be shipped by commercial carrier will be packed in a sample cooler lined with a plastic bag. Ice, double-bagged in resealing bags, will be added to the cooler in sufficient quantity to keep the samples cooled to $4\pm 2^{\circ}\text{C}$ for the duration of the shipment to the laboratory. Sample cooler drain spouts will be taped from the inside and outside of the cooler to prevent any leakage.

Saturday deliveries will be coordinated with the laboratory. If samples are picked up by a laboratory courier service, the COC form will be completed and signed by the laboratory courier. The cooler will then be released to the courier for transportation to the laboratory.

If a commercial carrier is used, the COC form will include the airbill number in the “transfers accepted by” column, and will be sealed in a resealable bag. The COC form will then be taped to the inside of the sample cooler lid. The cooler will be taped shut with strapping tape, and two custody seals will be taped across the cooler lid: one seal in the front and one seal in the back. Clear tape will be applied to the custody seals to prevent accidental breakage during shipping. The samples will then be shipped to the analytical laboratory. A copy of the courier airbill will be retained for documentation.

6.8 Field Documentation

Sampling information will be recorded in a permanently-bound field logbook, on a COC form, and in the Field Daily Activity Log. All entries will be legible and recorded in ink. Sampling location documented in the Field Daily Activity Log will include the following:

- Sampling point ID (for boring ID)
- Depth of soil samples

6.8.1 Chain-of-Custody

The COC form will be completed according to the requirements of IT SOP 1.1.

6.8.2 Field Logbooks

A permanently-bound field logbook with consecutively numbered pages will be assigned to this project. All entries will be recorded in indelible ink. Corrections will be made following procedures described in Section 6.8.3. At the end of each workday, the logbook pages will be signed by the responsible sampler and any unused portions of a logbook page will be crossed out, signed, and dated.

If it is necessary to transfer the logbook to another person, the person relinquishing the logbook will sign and date the last page used, and the person receiving the logbook will sign and date the next page to be used.

At a minimum, the logbook will contain the following information:

1. Project name and location (on the front page of the log book)
2. Date and time of collection for each sample in the upper right corner of each page
3. Sample number
4. Sample location (soil boring, sampling point, monitoring well IDs)
5. Sample type (soil water, air)
6. Composite or grab
7. Composite type (the number of grab samples)
8. Depth of sample
9. Weather information (rain, sunny, approximate temperature, etc.)
10. Containers used (metal liners, glass bottles, etc.)
11. Requested analysis (instead of amount collected)

In the graph paper portion of the logbook the following information is required:

1. A map with sample locations or a pasted copy of a map. Each sample location must be clearly identified on the map. Several sample locations may be presented on one page, refer to this page on the individual sample pages.
2. Field analyses performed, including results, instrument checks, problems, and calibration records for field instruments
3. Descriptions of deviations from the FSP
4. Problems encountered and corrective action taken
5. Identification of field QC samples
6. QC activities
7. Verbal or written instructions from the Navy and IT QC Manager
8. Any other events that may affect the samples

Cross out the unused portion and sign each page of the logbook.

6.8.3 Document Corrections

Changes or corrections on any project documentation will be made by crossing out the item with a single line, initialing by the person performing the correction, and dating the correction. The original item, although erroneous, will remain legible beneath the cross-out. The new information will be written above the crossed-out item. Corrections will be written clearly and legibly with indelible ink.

7.0 References

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FIGURES

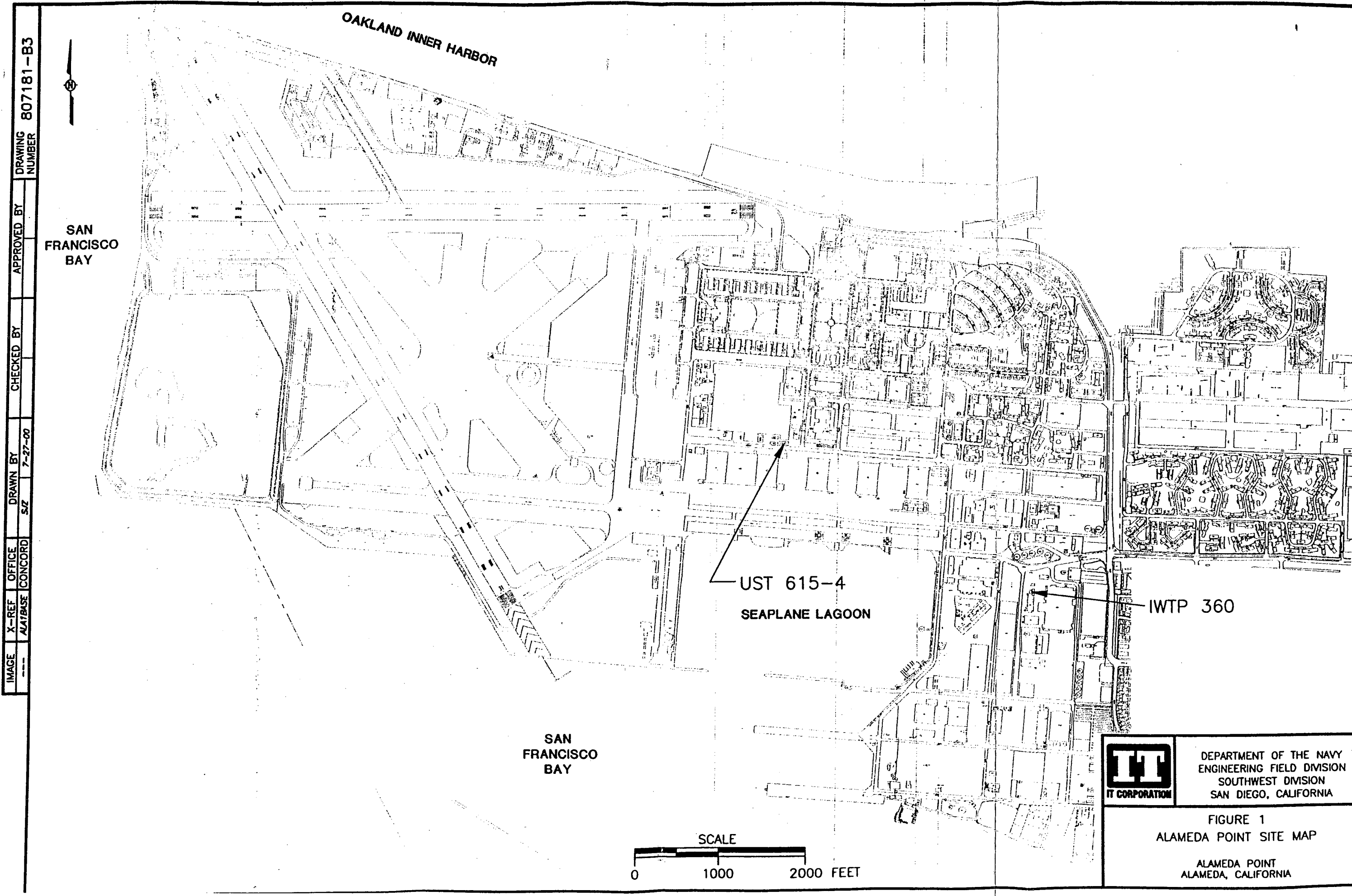



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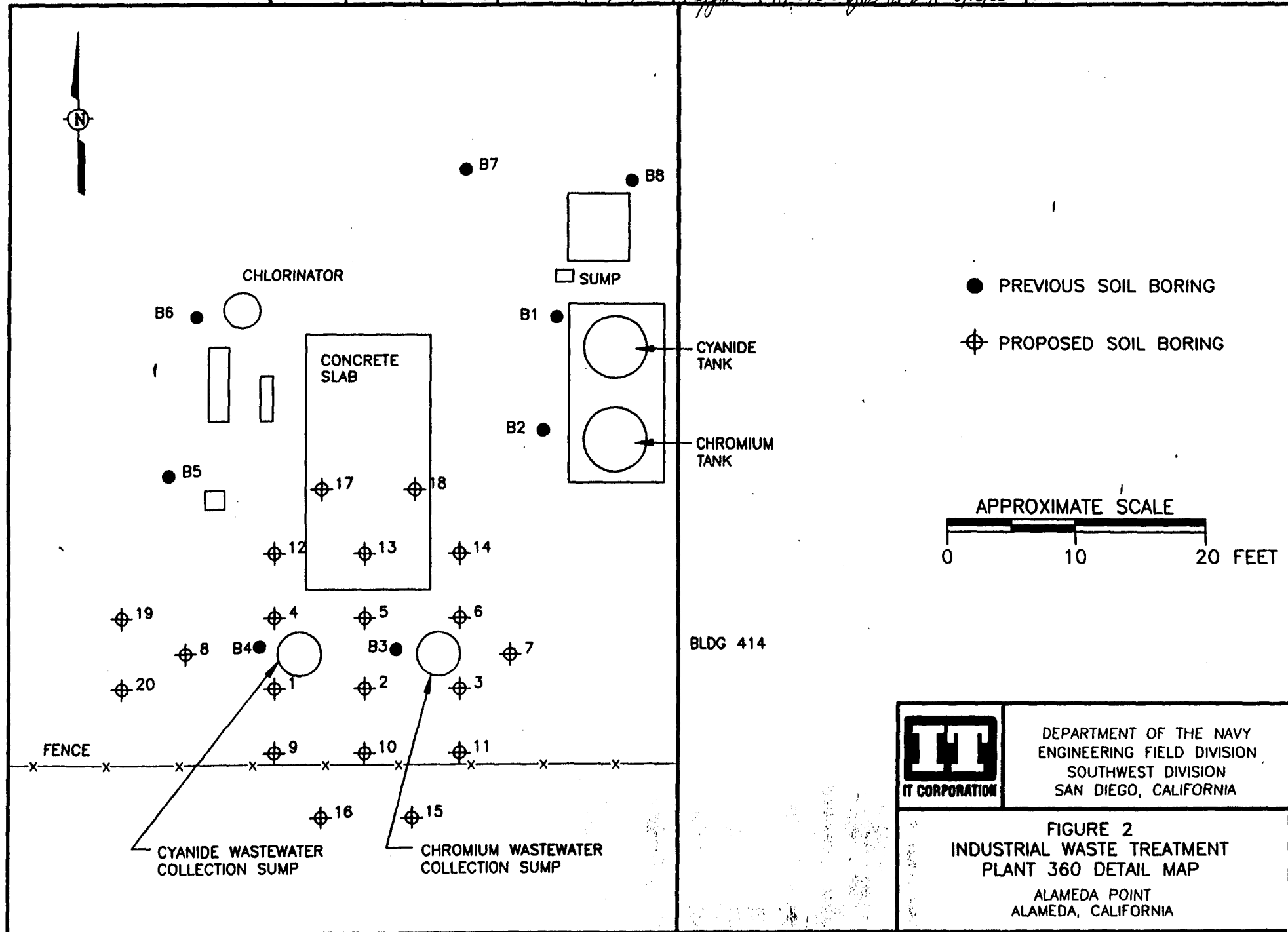


DEPARTMENT OF THE NAVY
ENGINEERING FIELD DIVISION
SOUTHWEST DIVISION
SAN DIEGO, CALIFORNIA

FIGURE 1
ALAMEDA POINT SITE MAP

ALAMEDA POINT
ALAMEDA, CALIFORNIA

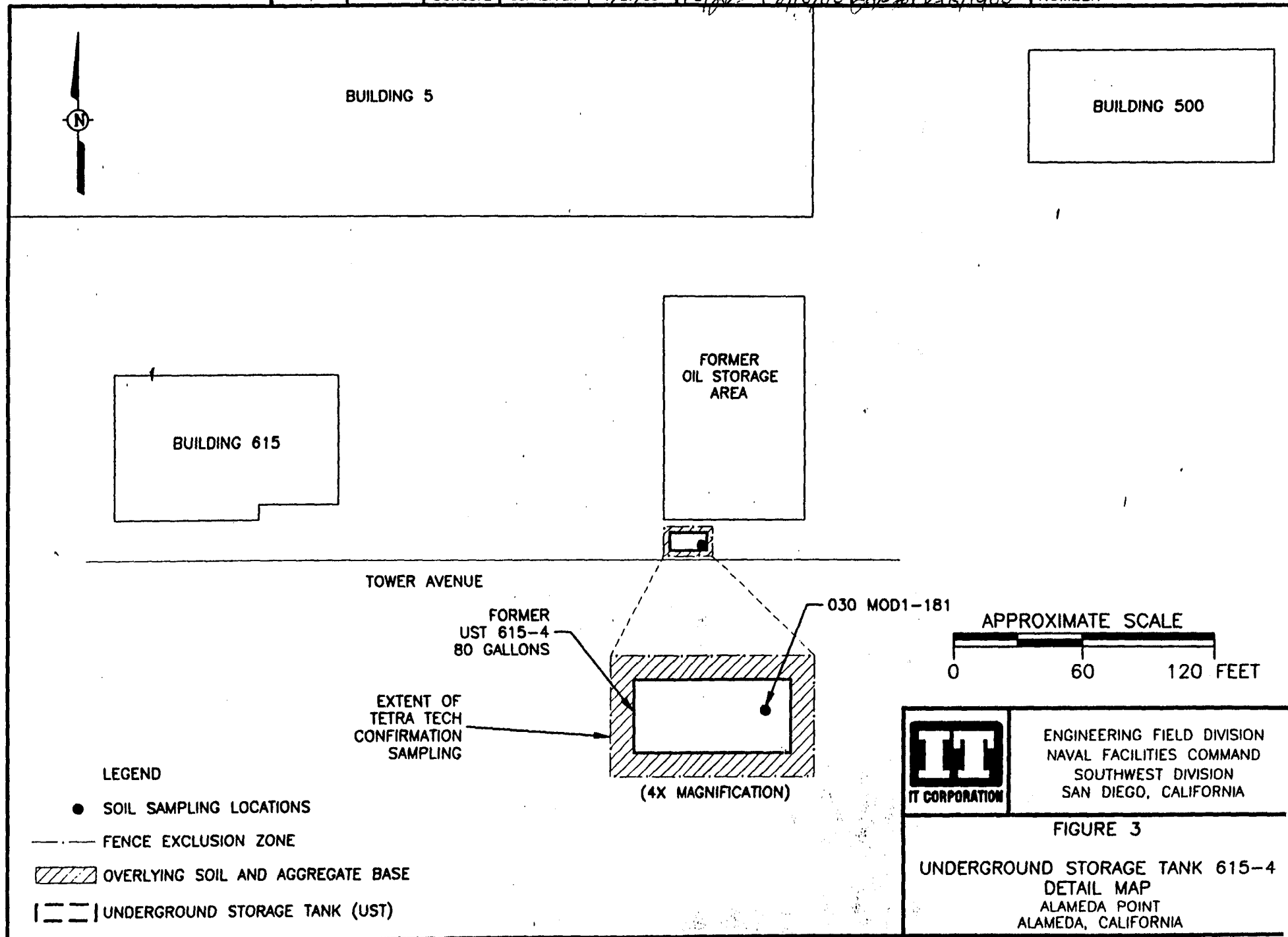
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DEPARTMENT OF THE NAVY
ENGINEERING FIELD DIVISION
SOUTHWEST DIVISION
SAN DIEGO, CALIFORNIA

FIGURE 2
INDUSTRIAL WASTE TREATMENT
PLANT 360 DETAIL MAP
ALAMEDA POINT
ALAMEDA, CALIFORNIA

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
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TABLES

Table 1
Sample Containers, Preservatives, and Holding Times

Analytes	Method	Container ¹	Preservative	Holding Time
Water and Wastewater				
VOCs	EPA 8260B	Three 40-mL VOA vials, Teflon [®] -lined septum	HCl to pH<2 Cool at 4±2°C	14 days (7 days if unpreserved)
SVOCs	EPA 8270C	Two 1-liter amber bottles, Teflon [®] -lined cap	Cool at 4±2°C	7 days before extraction, 40 days after extraction
TPH as gasoline	EPA 8015B	Three 40-mL VOA vials, Teflon [®] -lined septum	HCl to pH<2 Cool at 4±2°C	14 days (7 days if unpreserved)
TPH as diesel and motor oil	EPA 8015B	Two 1-L amber bottles, Teflon [®] -lined cap	Cool at 4±2°C	7 days before extraction, 40 days after extraction
Oil and Grease	EPA 418.1	Two 1-L amber bottles, Teflon [®] -lined cap	H ₂ SO ₄ to pH<2 Cool at 4±2°C	28 days
CAM 17 Metals	EPA 6010B/7000A series	500-mL HDPE	HNO ₃ to pH<2, Cool at 4±2°C	180 days for all metals except hexavalent chromium and mercury 28 days for mercury
PH	EPA 9040B	100-mL HDPE	Cool at 4±2°C	24 hours after laboratory receipt
Ignitability	EPA 1010	500-mL amber bottle, Teflon [™] -lined cap	Cool at 4±2°C	14 days
Reactivity	SW 846 Chapter 7			7 days

Soil

VOCs	EPA 8260B	Three 40-mL VOA vials, or three EnCore [®] devices	Cool at 4±2°C	48 hours
TPH as gasoline	EPA 8015B	Three 40-mL VOA vials, or three EnCore [®] devices	Cool at 4±2°C	48 hours
SVOCs	EPA 8270C	Two brass sleeves, two 6-inch acetate liners, or 8-ounce glass jar with a Teflon [™] -lined lid	Cool at 4±2°C	14 days before extraction, 40 days after extraction
TPH as diesel and motor oil	EPA 3630C and EPA 8015B			14 days before extraction, 40 days after extraction
Oil and grease	EPA 418.1			28 days
CAM 17 Metals	EPA 6010B/7000A series			180 days for all metals except mercury 28 days for mercury
pH	EPA 9045C			48 hours from laboratory receipt
Ignitability	EPA 1010			14 days
Reactivity	SW 846 Chapter 7			7 days

¹Additional sample containers will be provided for matrix spike/matrix spike duplicate analyses.

°C denotes degrees Celsius.

EPA denotes U.S. Environmental Protection Agency.

HCl denotes hydrochloric acid.

HDPE denotes high-density polyethylene.

HNO₃ denotes nitric acid.

L denotes liter.

mL denotes milliliter.

SVOC denotes semivolatile organic compound.

TPH denotes total petroleum hydrocarbons.

VOC denotes volatile organic compound.

Table 2
Summary of Field Sampling and Analysis

Matrix	Number of Field Samples	Number of QC Samples	Analysis	Description
Soil Confirmation Sampling				
Soil	100	10 Duplicates 5 MS/MSDs	Cadmium and Chromium (EPA Method 6010B)	20 Geoprobe® borings at Building 360 IWTP (5 samples from each soil boring)
Soil	4	1 Duplicate 1 MS/MSD	SVOCs (EPA Method 8270C) TPH as gasoline (EPA 8015B) TPH as diesel and motor oil (EPA 3630C and 8015B)	4 Sidewalls from hand auger at UST 615-4
Disposal Profile				
Concrete Cores	3	None	CAM 17 Metals (EPA Method 600B/7000 series) Reactivity as cyanide (SW846 Chapter 7)	1 concrete core per 300 square feet
Excavated Soil and Soil-cuttings from borings	2	None	VOCs (EPA Method 8260B) SVOCs (EPA Method 8270C) CAM 17 Metals (EPA Method 6010B/7000 series) TPH as gasoline, diesel, and motor oil (EPA Method 8015B) Oil and Grease (EPA 418.1) pH (EPA Method 9040B) Ignitability (EPA Method 1010) Reactivity (SW846 Chapter 7) Possible TCLP (EPA Method 1311) and STLC analysis (CCR Title 22)	One 4-point composite sample per 500 cubic yards per site
Wastewater	2	None	VOCs (EPA Method 8260B) SVOCs (EPA Method 8270C) CAM 17 Metals (EPA Method 6010B/7000 series) TPH as gasoline, diesel, and motor oil (EPA Method 8015B) Oil and Grease (EPA 418.1) pH (EPA Method 9045C) Ignitability (EPA Method 1010) Reactivity (SW846 Chapter 7)	One grab sample per stream per site

CAM denotes California Assessment Manual

EPA denotes U.S. Environmental Protection Agency.

MS/MSD denotes matrix spike/matrix spike duplicate.

SVOC denotes semivolatile organic compound.

TPH denotes total petroleum hydrocarbon.

VOC denotes volatile organic compound.

**QUALITY ASSURANCE PROJECT PLAN
FOR THE FIELD SAMPLING INVESTIGATION PLAN
FOR THE BUILDING 360 INDUSTRIAL WASTE TREATMENT PLANT AND
SOUTHEAST CORNER OF BUILDING 5
ALAMEDA POINT
ALAMEDA, CALIFORNIA**

**Contract No. N62474-98-D-2076
Contract Task Order No. 0013, Modification 1**

Submitted to:

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Southwest Division
Naval Facilities Engineering Command
Environmental Division
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Submitted by:

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Revision 0

August 2000

Issued to: Don Boden

Date: 8/14/00



Controlled



Uncontrolled

**QUALITY ASSURANCE PROJECT PLAN
FOR THE FIELD SAMPLING INVESTIGATION PLAN
FOR THE BUILDING 360 INDUSTRIAL WASTE TREATMENT PLANT AND
SOUTHEAST CORNER OF BUILDING 5
ALAMEDA POINT
ALAMEDA, CALIFORNIA**

**Contract No. N62474-98-D-2076
Contract Task Order No. 0013, Modification 1**

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August 2000

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DRAFT
QUALITY ASSURANCE PROJECT PLAN
FOR THE FIELD SAMPLING INVESTIGATION PLAN
FOR THE BUILDING 360 INDUSTRIAL WASTE TREATMENT PLANT AND
THE FORMER UNDERGROUND STORAGE TANK 615-4 AT THE
SOUTHEAST CORNER OF BUILDING 5
ALAMEDA POINT
ALAMEDA, CALIFORNIA

Contract No. N62474-98-D-2076
Contract Task Order No. 0013, Modification 1

Revision B

July 2000

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Table 12	Metals Data Deliverables Package Requirements
Table 13	Data Qualifiers

Acronyms and Abbreviations

°C	degrees Centigrade
bgs	below ground surface
CCV	continuing calibration verification
CCR	California Code of Regulation
CDQM	Chemical Data Quality Manual
CLP	Contract Laboratory Program
COC	chain-of-custody
CTO	Contract Task Order
DHS	Department of Health Services
DQAR	Data Quality Assessment Report
DQO	data quality objective
EDD	electronic data deliverable
EFA	Environmental Field Activity
ELAP	Environmental Laboratory Accreditation Program
EPA	U.S. Environmental Protection Agency
FSP	Field Sampling Plan
GC	gas chromatography
GC/MS	gas chromatograph/mass spectrometer
GLP	Good Laboratory Practice
HAZWRAP	Hazardous Waste Removal Action Program
IDW	investigation-derived waste
IT	IT Corporation
ITEMS	IT Environmental Management System
IWTP	Industrial Waste Treatment Facility
LCS	laboratory control sample
LCD	laboratory control duplicate
MS	matrix spike
MSA	method of standard addition
MSD	matrix spike duplicate
NCR	Nonconformance Report
NFESC	Naval Facilities Engineering Service Center
NIST	National Institute for Standards and Testing
PARCC	precision, accuracy, representativeness, completeness, and comparability
PE	performance evaluation
PRG	Preliminary Remediation Goal
QA	quality assurance
QA/QC	quality assurance/quality control
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	quality control
RAC	Remedial Action Contract
RCRA	Resource Conservation and Recovery Act

Acronyms and Abbreviations, Continued

RPD	relative percent difference
SAP	Sampling and Analysis Plan
SD	sample duplicate
SDG	sample delivery group
SOP	Standard Operating Procedure
SOW	Statement of Work
SVOC	semivolatile organic compounds
SWDIV	U.S. Navy Southwest Division
TCLP	Toxicity Characteristic Leaching Procedure
TPH	total petroleum hydrocarbons
TtEMI	Tetra Tech EM Inc.
UST	underground storage tank
VOC	volatile organic compound
WET	Waste Extraction Test

1.0 Introduction

IT Corporation (IT) has prepared this Quality Assurance Project Plan (QAPP) in support of soil excavations at two Resource Conservation and Recovery Act (RCRA) Part A-permitted sites at Alameda Point, Alameda, California. The goal of the excavations is to achieve closure at the two RCRA sites—Building 360 Industrial Waste Treatment Plant (IWTP) and Underground Storage Tank (UST) 615-4.

This work will be conducted under Contract Task Order (CTO) No. 0013 of Naval Facilities Engineering Command Engineering Field Activity – West (EFA-West) Remedial Action Contract (RAC) No. 62474-98-D-2076.

This QAPP is based on the requirements of the following documents:

- *Naval Facilities Engineering Command Navy Installation Restoration Chemical Data Quality Manual (IR CDQM)*, (Naval Facilities Engineering Service Center [NFESC], 1999)
- *Guidance for the Data Quality Objectives Process*, EPA QA/G-4 (U.S. Environmental Protection Agency [EPA], 1994)
- *Guidance for the Data Quality Objectives Process for the Hazardous Waste Sites*, EPA QA/G-4HW (EPA, 1997a)
- *Guidance for Quality Assurance Project Plans*, EPA QA/G-5 (EPA, 1997b)
- *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, Third Edition, Update III (EPA, 1996b)
- *Contract Laboratory Program Statement of Work for Inorganic Analysis*, ILM04.0 (EPA, 1991)
- *Contract Laboratory Program Statement of Work for Organic Analysis*, OLM04.2 (EPA, 1999a)
- *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (EPA, 1994b)
- *Contract Laboratory Program National Functional Guidelines for Organic Data Review* (EPA, 1999d)
- *Requirements for Quality Control of Analytical Data*, DOE/HWP-65/R1 (Hazardous Waste Remedial Action Program [HAZWRAP], 1990)

- *Requirements for Quality Assurance Project Plan, EPA QA/R-5, August (EPA, 1999b)*
- *Guidance for Data Quality Assessment QA/G-9, July (EPA, 1996a)*
- *Guidance for Field Sampling Plan Preparation, August (EPA, 1993)*
- *Environmental Work Instruction No. 1-Chemical Data Validation, October 1999 (U.S. Navy Southwest Division [SWDIV])*
- *Environmental Work Instruction No. 2 – Review, Approval, Revision, and Amendment of Field Sampling Plans and Quality Assurance Project Plan, October (SWDIV, 1999)*
- *Environmental Work Instruction No. 3 – Laboratory Quality Assurance Program, October (SWDIV, 1999)*

This QAPP and the preceding Field Sampling and Analysis Plan (FSP) (Parts I and II, respectively) constitute the Sampling and Analysis Plan (SAP). The FSP has the following objectives:

- Providing a rationale for field sampling activities
- Describing the sampling strategy and design
- Describing and establishing consistent field sampling procedures
- Establishing data gathering, sample handling, and documentation methods that will be employed during field activities

Quality control requirements associated with the sampling activities are presented in the FSP and will not be repeated here.

In compliance with the EPA, the QAPP elements are categorized into four groups that have been addressed in the SAP as follows:

Group A. Project Management

- Title and approval sheet
- Table of contents
- Project/Task organization – QAPP Section 2.0
- Data Quality Objectives – QAPP Section 3.0
- Documentation and records – FSP Section 6.6, QAPP Section 5.0

Group B. Measurement/Data Acquisition

- Sampling methods requirements – FSP Sections 5.0 and 6.0
- Sample handling and custody requirements –FSP Section 6.0 and QAPP Section 5.0
- Analytical method requirements – QAPP Sections 3.2.7 and 3.2.8
- Quality control requirements – QAPP Sections 3.2 and 6.2
- Instrument/equipment testing, inspection and maintenance requirements – QAPP Section 6.2.2
- Instrument calibration and frequency – QAPP Section 6.2.1
- Acceptance requirements for supplies and consumables – QAPP Section 6.2.4

Group C. Assessment/Oversight

- Assessments and response actions – QAPP Section 6.3 and 8.0
- Reports to management – QAPP Section 8.0

Group D. Data Validation and Usability

- Data review, validation, and verification requirements – QAPP Section 7.1
- Validation and verification methods - QAPP Section 7.3
- Reconciliation with user requirements – QAPP Section 7.4

1.1 Objective

This QAPP has been prepared to ensure that the data collected over the course of the project are of known quality to meet their intended use, and that all components of data acquisition thoroughly documented, verifiable, and defensible. This document describes the project data quality objectives (DQOs) and based on these DQOs derives appropriate quality assurance (QA) objectives and quality control (QC) requirements to ensure that the acquired data are valid and usable. The QAPP outlines the criteria for data quality in terms of precision, accuracy, representativeness, comparability, and completeness, often referred to as the PARCC parameters.

1.2 Background

This information is provided in Section 2.0 of the FSP.

2.0 Project Organization

The project organization consists of representatives from the Navy providing technical direction and QA oversight, and the IT Team. The project organization, which is shown in Figure 1, “Project Organization Chart,” consists of the following members:

- Remedial Project Manager, Southwest Division
- U.S. Navy QA Officer (QAO)
- Project Manager, IT
- Program QC Manager, IT
- Program Chemist, IT
- Program Health and Safety Manager, IT
- Site Health and Safety Officer, IT
- Task Manager, IT
- Lead Project Engineer, IT
- Lead Project Geologist, IT
- Project QC Manager, IT
- Project Chemist, IT
- Field Technician, IT

The responsibilities of the team members associated with data acquisition activities are presented in Table 1, “Project Personnel and Chemical Data Collection Responsibilities.”

3.0 *Quality Assurance Objectives*

DQOs are qualitative and quantitative statements that clarify the project objectives; specify the most appropriate type of data for the project decisions; determine the most appropriate conditions from which to collect data; and specify tolerable limits on decision errors. DQOs are based on the end uses of the data and are determined through a seven-step process as described in QA/G-4 (EPA, 1994).

In addition to the project objectives, the DQOs specify data collection boundaries and limitations, the most appropriate type of data to collect, and the level of decision error that will be acceptable for the decision.

3.1 *Data Quality Objectives*

The DQO process is a series of planning steps based on scientific methods that are designed to ensure that the type, quantity, and quality of environmental data used for decision-making are appropriate for the intended application. The DQO process, as defined by the EPA, consists of seven steps that are designed to provide a systematic approach to resolving issues that pertain to the site investigation and remediation (EPA, 1994). This section of the QAPP describes the outcome of the seven-step DQO process for data collection activities under CTO 0013.

3.1.1 *Stating the Problem*

Step 1: Summarize the problem that requires environmental data acquisition and identify the resources available to resolve the problem.

The former Building 360 IWTP area has elevated cadmium and total chromium concentrations in soil, which exceeds the EPA Region 9, Residential Preliminary Remediation Goals (PRG). Soil at the former UST 615-4 location contains elevated concentrations of total petroleum hydrocarbons (TPH) and semivolatile organic compounds (SVOCs). Groundwater conditions at both sites are not within the scope of work for this CTO.

3.1.2 *Identifying the Decisions*

Step 2. Identify the decision that requires acquisition of environmental data. Identify the intended use of the data.

The decisions that require environmental data acquisition are to collect soil samples from the Building 360 IWTP and former UST 615-4 areas to confirm closure.

The data acquired during the project activities will be used to answer the following questions:

- What are the vertical and lateral extents of elevated cadmium and total chromium concentrations in the vicinity of the sumps at the Building 360 IWTP area?
- Following excavation, are the total concentrations for TPH as diesel and motor oil at the former UST 615-4 location below the cleanup goals?
- What is the final disposition of all investigation-derived waste (IDW)?

3.1.3 Identifying Inputs to the Decisions

Step 3. Identify the information needed to support the decision and specify the inputs requiring environmental measurements.

The input data to the decisions regarding the vertical and lateral extent of metals contamination at the Building 360 IWTP area are the cadmium and total chromium concentrations in soil associated with the surface and subsurface in the former sump area. The concentrations of TPH as diesel and motor oil will determine if the extent of soil excavated at the former UST 615-4 location is sufficient.

The input to the decisions regarding the disposition of IDW will be the analytical data associated with the samples collected from each of the waste matrices.

3.1.4 Defining the Boundaries

Step 4. Specify the spatial and temporal aspects of the environmental media that the data must represent to support the decision.

Within the former IWTP area, 20 pre-excavation sampling locations have been identified. The locations are within an area approximately 28 feet by 28 feet, and surround the two locations where elevated concentrations of cadmium and total chromium were previously detected above the regulatory criteria.

Based on the data gap sampling completed by Tetra Tech EM, Inc. (TtEMI) in May 2000, the spatial boundaries of the TPH contamination at the former UST 615-4 location are anticipated to be 4 feet laterally in all directions from the original excavation and down to the water table (approximately 5 feet bgs). Soil will be removed to those limits, and confirmation samples will be collected.

All sampling activities for the RCRA removals are expected to be completed by mid-September 2000.

3.1.5 Developing a Decision Rule

Step 5. Develop a logical statement “if...then” that defines the conditions that would cause the decision-maker to choose among alternative actions.

- If concentrations of cadmium and total chromium are above the residential PRGs in samples from the inner eight borings at the Building 360 IWTP area, then additional samples from “step-out” locations will be analyzed as necessary to define the limits of concentrations above the PRGs.
- If the concentrations of cadmium or total chromium in the borings at the Building 360 IWTP area are below the residential PRG concentrations, then the extent of contamination has been defined.
- If the concentrations of cadmium or total chromium in the step-out borings at the Building 360 IWTP area are above the associated residential PRG concentrations, then additional soil borings may need to be completed to determine the extent of contamination.
- If the concentrations of TPH following soil excavation at the former UST 615-4 area are above the cleanup goal for total TPH as diesel and motor oil, then additional excavation may be required as directed by the Navy.
- If the concentrations of chemicals of concern following excavation at the former UST 615-4 area are below the cleanup goal for total TPH as diesel and motor oil, then the area will be considered adequate for closure.
- If aqueous and nonaqueous waste are considered hazardous by law, then the waste will be transported for disposal at a state-approved hazardous disposal facility.
- If aqueous and nonaqueous waste are considered nonhazardous by law, then the waste will be disposed of at a nonhazardous disposal facility.

3.1.6 Specifying Limits on Decision Error

Step 6. Specify the decision-maker's acceptable limits on decision errors, which are used to establish appropriate performance goals for limiting uncertainty in environmental data.

This sampling program entails biased sampling in order to address the soil excavation and closure activities for each site. As such it is not possible to calculate a sampling design error. Because measurements will be collected as analytical data, measurement errors will be determined by the data quality indicator parameters as well as the reporting limits developed for the this project. The data that meet these criteria will be of definitive quality, and the estimated data that do not meet the criteria are less certain.

3.1.7 Optimizing the Design for Obtaining Data

Step 7. Identify the most resource effective sampling and analysis design for generating data that are expected to satisfy project DQOs.

Sampling at the two sites is being completed as step-outs from the current areas of known contamination to define the extents of contamination and areas that require soil excavation. These locations are representative of both past history and sampling results for each site.

The optimized sampling design is presented in Section 4.0 of the FSP.

3.2 Analytical Data Quality Objectives

A laboratory with appropriate capabilities and accreditation will produce analytical data required for the project using EPA- and other-approved methods of analysis. Analytical DQOs will be assessed through application of the PARCC parameters. Laboratory QC checks that allow deriving the PARCC parameters and the applicable QC criteria are defined in this section. Because precision and accuracy information may be expressed in several ways, only the definitions for these indicators that are provided in this section will be used for data quality assessment. This section also provides information on the analytical methods to be used, and the project-required reporting limits for the target analytes.

3.2.1 Laboratory QC Checks

The recovery of known additions is a part of laboratory analytical protocols. The use of additives at known concentrations allows detecting the matrix interferences and estimating the impact of these interferences when present. It also allows evaluating the efficiency of extraction procedures and overall accuracy of analysis. Laboratory internal QC checks will include the following:

- Laboratory Control Samples (LCS)
- Laboratory Control Duplicates (LCD)
- Matrix spikes (MS)
- Matrix spike duplicates (MSD)
- Laboratory sample duplicates (SD)
- Surrogate standards
- Internal standards
- Method and instrument blanks
- Post-digestion spikes

3.2.2 Laboratory Control Samples

Laboratory control samples are matrix equivalent QC check samples (analyte-free water, laboratory sand, or sodium sulfate) spiked with a known quantity of specific analytes that are carried through the entire sample preparation and analysis process. The spiking solution used for LCS/LCD preparation is of a source different from the stock that was used to prepare calibration standards.

3.2.3 Laboratory Duplicates

For laboratory SD analyses, a sample is prepared and analyzed twice. Laboratory SDs are prepared and analyzed with each batch of samples for most inorganic analyses.

3.2.4 Matrix Spikes

Matrix spikes are QC check samples that measure matrix-specific method performance. A matrix spike sample is prepared by adding a known quantity of target analytes to a sample prior to sample digestion or extraction. In general, for organic compound and metal analyses, a MS/MSD pair is prepared and analyzed with each preparation batch or for every 20 field samples. The frequency of MS/MSD analysis depends on the project DQOs. For inorganic compound analysis, a single MS and a laboratory SD are often prepared and analyzed with each batch. The LCS results, together with matrix spike results, allow verifying the presence of matrix effects.

3.2.5 Surrogate Standards

Organic compound analyses include the addition, quantitation, and recovery calculation of surrogate standards. Compounds selected to serve as surrogate standards must meet all of the following requirements:

- Are not the target analytes
- Do not interfere with the determination of target analytes
- Are not naturally occurring, yet chemically similar to the target analytes
- Are compounds exhibiting similar response to target analytes

Surrogate standards are added to every organic analytical and QC check sample at the beginning of the sample preparation. The surrogate standard recovery is used to monitor matrix effects and losses during sample preparation. Surrogate standard control criteria are applied to all analytical and QC check samples, and if surrogate criteria are not met, re-extraction and re-analysis may be required, depending on the severity.

3.2.6 Internal Standards

Some organic compound analyses include the addition, quantitation, and recovery calculation of internal standards. Internal standards are usually synthetic compounds, which are similar in chemical behavior to the target analytes. They are added to sample extracts at the time of instrument analysis, and are used to quantitate results through the internal standards calibration procedure. Internal standard recoveries are used to correct for injection and detector variability. Gas chromatography/mass spectrometry (GC/MS) must use internal standards and have acceptability limits for internal standard areas.

3.2.7 Method Blanks

A method blank is used to monitor the laboratory preparation and analysis systems for interferences and contamination from glassware, reagents, sample manipulations, and the general laboratory environment. A method blank is carried through the entire sample preparation process, and is included with each batch of samples. Some methods of inorganic analysis do not have a distinctive preparation step. For these tests the instrument blank, which contains all reagents used with samples, is considered to be the method blank.

3.2.8 Instrument Blanks

An instrument blank is used to monitor the cleanliness of the instrument portion of a sample analysis process. Instrument blanks are usually just the solvent or acid solution of the standard used to calibrate the instrument. During metals analyses one instrument blank is usually analyzed for every ten samples. For GC/MS analysis instrument blanks are analyzed on an as-needed basis for troubleshooting and chromatography column carryover determination purposes.

3.3 Data Quality Indicators

This section defines the data quality indicators and their use for assessment of data quality.

3.3.1 Post-Digestion Spikes and the Method of Standard Addition

A post-digestion spike is used during metal analysis to assess analytical interferences that may be caused by general matrix effects or high concentrations of analytes present in the sample. A digested sample is spiked with the analyte of interest at a known concentration, and the spike recovery is used to estimate the presence and magnitude of interferences.

If a post-digestion spike recovery fails to meet acceptance criteria, the MSA will be used to quantitate the sample result. The MSA technique compensates for a sample constituent that enhances or depresses the analyte signal. To perform the MSA, known amounts of a standard at

different concentrations are added to 2-3 aliquots of digested sample, and each spiked sample and the original unspiked sample are analyzed. The absorbance is then plotted against the concentration, and the resulting line is extrapolated to zero absorbance. The point of interception with the concentration axis is the indigenous concentration of the analyte in the sample.

3.3.2 Precision

Precision measures the reproducibility of measurements under a given set of conditions. The following equation illustrates the method for calculating relative percent difference (RPD) to assess a method's precision:

$$\text{Precision as RPD} = \frac{2 \times (\text{Result} - \text{Duplicate Result})}{\text{Result} + \text{Duplicate Result}} \times 100\%$$

The laboratory uses MS/MSD pairs to assess the precision of analytical procedures, with one MS/MSD pair analyzed for every batch of up to 20 samples. According to the Navy requirements, analytical laboratories perform MS/MSD on the Navy project samples. This allows determining whether matrix interferences may be present.

The laboratory uses LCS/LCD pairs when matrix spikes are not practical due to the nature of a sample or analytical method used, and they are prepared and analyzed with each batch of samples instead of MS/MSD. LCS/LCD may also be prepared in place of MS/MSD in the case that a sufficient sample volume was not obtained in the field to perform the MS/MSD analysis. For inorganic analyses, analytical precision is usually calculated based on the sample and sample duplicate results.

Each analytical laboratory must have statistically calculated acceptability limits for RPDs for each method of analysis and sample matrix. The laboratory will review the QC samples to ensure that internal QC data lies within the limits of acceptability. Any suspect trends will be investigated and corrective actions taken. The analytical precision acceptability limits for results detected above the reporting limit in this project will be as follows:

Soil: 20% for metals and 30% for all other analyses
Water: 20% for all analyses

Precision of sampling procedures is evaluated by collecting and analyzing "blind" field duplicate samples (field QC samples) at a rate of one for every 10 samples. Sampling precision will be evaluated based on the RPD for field duplicate samples. The field precision acceptability limits for results detected above the reporting limits will be as follows:

Soil: 50% for all analyses
Water: 20% for all analyses

Field precision will be monitored for evaluating of the sampling techniques and sample handling procedures. Analytical data will not be qualified during the data validation process based on the field precision values.

3.3.3 Accuracy

Accuracy measures the bias of an analytical system by comparing the difference of a measurement with a reference value. The percent recovery of an analyte, which has been added to the environmental samples at a known concentration before extraction and analysis, provides a quantitation tool for analytical accuracy. The spiking solutions used for accuracy determinations are not used for instrument calibrations. The following equation illustrates how accuracy is evaluated:

$$\text{Accuracy as percent recovery} = \frac{\text{Spiked Sample Result} - \text{Sample Result}}{\text{Spiked Sample True Value}} \times 100\%$$

Percent recoveries for MS, MSD, and LCS that are analyzed for every batch of up to 20 samples serve as a measure of analytical accuracy. Surrogate standards are added to all samples, blanks, MS, MSD, and LCS analyzed for organic contaminants to evaluate the method's accuracy and help to determine matrix interferences.

As a general rule, the recovery of most compounds spiked into samples is expected to fall within a range of 70% to 130%. This range represents the EPA advisory acceptability limits for MS, MSD, and LCS for all organic analysis methods. The surrogate standard advisory acceptability limits are also 70% to 130% for all organic analyses with the exception of GC/MS methods, where these limits are specified in the methods for each matrix. Laboratories may use the advisory limits until the in-house statistically-based control limits are developed for each method of organic analysis and sample matrix. EPA SW-846 mandates the recovery acceptance limits for metal analysis at 75% to 125%.

Control limits are defined as the mean recovery, plus or minus three standard deviations, of the 20 data points, with the warning limits set as the mean, plus or minus two standard deviations. The laboratory will review the QC samples and surrogate standard recoveries for each analyses to ensure that internal QC data lie within the limits of acceptability. The laboratory will investigate any suspect trends and take appropriate corrective actions.

3.3.4 Representativeness

Unlike precision and accuracy, which can be expressed in quantitative terms, representativeness is a qualitative parameter. Representativeness is the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point or an environmental condition. It is a qualitative parameter that depends on proper design of the sampling program.

Field personnel will be responsible for ensuring that samples are representative of field conditions by collecting and handling samples according to approved SAP and field Standard Operating Procedures (SOPs). Errors in sample collection, packaging, preservation, or chain-of-custody procedures may result in samples being judged non-representative and may form a basis for rejecting the data.

Data generated by the laboratory must be representative of the laboratory database of accuracy and precision measurements for analytes in different matrices. Laboratory procedures for sample preparation will ensure that aliquots used for analysis are representative of the whole sample.

3.3.5 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another, whether it was generated by a single laboratory or during interlaboratory studies. The use of standardized field and analytical procedures ensures comparability of analytical data.

Sample collection and handling procedures will adhere to EPA-approved protocols. Laboratory procedures will follow standard analytical protocols, use standard units, standardized report formats, follow the calculations as referenced in approved analytical methods, and use a standard statistical approach for QC measurements.

3.3.6 Completeness

Completeness is a measure of whether all the data necessary to meet the project DQOs have been collected. For the data to be considered complete, they must meet all acceptance criteria including accuracy and precision and other criteria specified for an analytical method. The data will be reviewed and /or validated to keep invalid data from being processed through data collection. Completeness is evaluated using the following equation:

$$\text{Completeness} = \frac{\text{Acceptable Results}}{\text{Total Results}} \times 100\%$$

The goal for completeness for all QC parameters, except holding times, will be 90%. The goal for holding times will be 100%. If these goals are not achieved, the sources of non-conformances will be evaluated to determine whether re-sampling and re-analysis is necessary.

3.4 Analytical Method Requirements

The following analytical methods will be used to obtain the data for this project:

- U.S. Environmental Protection Agency Test Methods for Evaluating Solid Waste, SW-846, Update III, 1996b will be used for the following:
 - Volatile organic compounds (VOCs) by EPA Method 8260B
 - SVOCs by EPA Method 8270C
 - TPH as gasoline, diesel, and motor oil by EPA Method 8015B
 - Silica gel cleanup by EPA Method 3630C
 - Metals by EPA Method 6010B/7000 series
 - pH by EPA Method 9040B and 9045C
 - Ignitability by EPA Method 1010
 - Reactivity by SW846 Chapter 7
 - Toxicity Characteristic Leaching Procedure (TCLP) by EPA Method 1311
- U.S. Environmental Protection Agency Methods for the Chemical Analysis of Water and Wastes, 1983 will be used for the following:
 - Oil and grease by EPA Method 418.1
- Miscellaneous Methods will be used for the following:
 - Waste Extraction Test (WET) by California Code of Regulations (CCR)

The laboratory will conduct these analyses according to method's requirements and laboratory SOPs.

3.5 Project-Required Reporting Limits

Reporting limits for the project are presented in Table 2 through Table 5. These limits may be elevated for individual samples if matrix interferences are encountered.

4.0 Sample Collection

4.1 Sampling Locations

Sample locations and the number of samples to be collected are described in Section 4.0 of the FSP, and are not repeated here.

4.2 Sample Collection

Sample collection procedures are described in Section 6.0 of the FSP, and are not repeated here.

4.3 Sample Containers, Preservatives, and Holding Times

Sample containers, preservatives, and holding times are described in Section 5.2 of the FSP, and are not repeated here.

4.4 Sample Packaging and Shipment

Sample packaging and shipping requirements are presented in Section 6.7 of the FSP and are not repeated here.

5.0 Sample Custody and Documentation

This section describes sample custody and field documentation procedures that IT will follow at the project site.

5.1 Chain of Custody

An overriding consideration for data resulting from laboratory analyses is the ability to demonstrate that the data are legally defensible, i.e., that the samples were obtained from the locations stated and that they reached the laboratory without alteration. To accomplish this, evidence of collection, shipment, laboratory receipt, and laboratory custody until disposal will be documented through the chain-of-custody (COC) record. A sample is considered to be in custody if it has the following constraints:

- In actual possession or in view of the person who collected the samples
- Locked in a secure area
- Placed in an area restricted to authorized personnel
- Placed in a container and secured with an official seal, such that the sample cannot be reached without breaking the seal

Figure 2, “Chain-of-Custody Form,” presents a copy of the COC record that will be used for the EFA-WEST RAC projects. The COC record lists each sample and the individuals performing the sample collection, shipment, and receipt. A separate COC will be completed for on-site and off-site laboratory analyses. The sample chain-of-custody procedures will be implemented according to ITSOP1.1. Figure 3, “Custody Seal,” presents an example of a custody seal that will seal a cooler filled with samples during transportation to the laboratory.

On project sites, samples will be stored in locked refrigerators at 2 degrees Centigrade (°C) to 6°C. Sample custody will be the responsibility of the Project Chemist or an on-site designee from the time of sample collection until the samples are accepted by the courier service for delivery to the laboratory. Thereafter, the laboratory performing the analysis will maintain custody.

5.2 Analysis Request

In addition to providing a custody exchange record for the samples, the COC record serves as a formal request for sample analyses. The COC records will be completed, signed, and distributed as follows:

- One copy retained by the sample coordinator for inclusion in the project files
- The original sent to the analytical laboratory with the sample shipment

After the laboratory receives the samples, the sample custodian will inventory each shipment before signing for it, and note on the original COC record any discrepancy in the number of samples, temperature of the cooler, or broken samples. The Project Chemist will be notified immediately of any problems identified with shipped samples. The Project Chemist will in turn notify the Project QC Manager, and together they will determine the appropriate course of action. The Project Chemist will also notify the Project Manager if the project budget and schedule may be impacted.

The laboratory will initiate an internal chain of custody that will track the sample within the various areas of the laboratory. The relinquishing signature of the sample custodian and the custody acceptance signature of the laboratory personnel transfer custody of the sample. This procedure is followed each time a sample changes hands. The laboratory will archive the samples and maintain their custody as required by the contract or until further notification from the Project Chemist at which time the samples will either be returned to the project for disposal or disposed of by the laboratory.

5.3 Field Sample Custody

The COC record will be the controlling document to assure that sample custody is maintained. The COC record will be initiated in the field by sampling personnel upon collecting a sample. Each individual who has the sample(s) in his/her possession will sign the COC. Each time the sample custody is transferred, the former custodian will sign the COC in the "Relinquished by" line, and the new custodian will sign the COC in the "Received by" line. The date, time, and the name of their project or company affiliation will accompany each signature.

The waybill number or courier name will be recorded on the COC when a commercial carrier is used. The shipping container will be secured with two custody seals, thereby allowing for custody to be maintained by the shipping personnel until receipt by the laboratory.

If the laboratory sample custodian judges sample custody to be invalid (e.g., custody seals have been broken), the laboratory will initiate a Nonconformance Report (NCR). The Project Chemist will be immediately notified. The Project Chemist will, in turn, notify the Project Manager and the Project QC Manager. The Project Manager will make a decision, in consultation with the client, as to the fate of the sample(s) in question on a case-by-case basis. The sample(s) will either be processed "as-is" with custody failure noted along with the analytical data, or rejected with re-sampling scheduled, if necessary. The nonconformance associated with the samples will be noted on the appropriate certificate or analysis or case history.

5.4 *Field Documentation*

Field documentation procedures are described in Section 6.6.2 of the FSP.

6.0 Analytical Quality Control Procedures

This section describes analytical QC procedures, including laboratory qualifications and QA program, and QC procedures associated with analytical methods.

6.1 Laboratory Qualifications

The analytical laboratory selected to analyze samples for this project will be certified by the California Department of Health Services (DHS) through the Environmental Laboratory Accreditation Program (ELAP) for all the analytical methods required for the project. In addition, the laboratory will have successfully completed the NFESC Laboratory Evaluation Program prior to sampling activities and maintain that status throughout the project.

The laboratory selected for the project must be capable of providing the required turnaround times, project QC, and data deliverables required by this QAPP and the FSP.

6.2 Laboratory Quality Assurance and Quality Control Program

Quality assurance is a set of operating principles that, if strictly followed during sample collection and analysis, will produce defensible data of known quality. Included in quality assurance are quality control and quality assessments. Quality control is a set of measures within a sample analysis methodology to assure that the process is in control. Quality assessment consists of procedures for determining the quality of laboratory measurements by use of data from internal and external quality control measures.

A properly designed and executed QC program will result in a measurement system operating in a state of statistical control, which means that errors have been reduced to acceptable levels. An effective QA program includes the following elements:

- Certification of operator competence
- Internal QC checks, such as recovery of known additions through use of surrogate standards, matrix spikes, and laboratory control samples
- Analysis of externally supplied standards
- Analysis of reagent blanks
- Calibration with standards using internal or external standard procedures
- Calibration verification with second source standard
- Analysis of duplicates

- Maintenance of control charts

Strict adherence to Good Laboratory Practices (GLPs) and consistent use of SOPs are also essential for a successful QC program. The laboratory will have the current revisions of the SOPs readily available for all staff. At a minimum, SOPs will be written for the following procedures and methods: sample receipt/control/disposal; sample preparation/extraction; sample analysis; result calculation; database management; health and safety; and corrective action.

The analytical laboratory will have written SOPs defining the instrument operation and maintenance, tuning, calibration, method detection limit determination, QC acceptance criteria, blank requirements, and stepwise procedures for each analytical method. The SOPs will be available to the analysts in the laboratory. Any method that is subcontracted by the laboratory to another laboratory or sent to another facility of the same network of laboratories will have a prior approval of the IT Project Chemist.

6.2.1 Calibration

All instruments will be calibrated and the calibration acceptance criteria must be met before samples are analyzed. Calibration standards will be prepared with National Institute for Standards and Testing (NIST)-traceable standards, where applicable, and analyzed per methods requirements. Initial calibration acceptance criteria documented in the laboratory SOPs will meet those of applicable guidance documents. The initial calibration will meet one of the following requirements:

- The lowest concentration of the calibration standard is less than or equal to the PQL based on the final volume of extract or sample.
- For each target analyte, at least one of the calibration standards will be at or below the regulatory limit (action level) as defined by the DQOs.

Before samples are analyzed, initial calibration will be verified with a second source standard prepared at the mid-point of the calibration curve. Initial calibration verification will meet the acceptance criteria which are expressed in the laboratory SOPs.

Daily calibration verification will be conducted at the method-prescribed frequencies, and will meet the acceptance criteria of applicable guidance documents. Daily calibration verification will not be used for quantitation of target analytes.

Calibration data (calibration tables, chromatograms, instrument printouts, and laboratory logbooks) will be clearly labeled to identify the source and preparation of the calibration standard and therefore, be traceable to the standard preparation records.

Calibration requirements and acceptance criteria for organic and inorganic analysis are summarized in Table 6 through Table 9.

6.2.2 Preventive Maintenance

The primary objective of a preventive maintenance program is to help ensure the timely and effective completion of a measurement effort by minimizing the down time of crucial analytical equipment due to expected or unexpected component failure. In implementing this program, efforts are focused in three primary areas: maintenance responsibilities; maintenance schedules; and adequate inventory of critical spare parts and equipment.

Maintenance responsibilities for laboratory equipment are assigned to the respective laboratory managers. The laboratory managers then establish maintenance procedures and schedules for each major equipment item. These are contained in the maintenance logbooks assigned to each instrument.

The effectiveness of any maintenance program depends to a large extent on adherence to specific routine maintenance for each major equipment item. Other maintenance activities may also be identified as requiring attention on an as-needed basis. Manufacturers' recommendations and/or sample throughput provide the basis for the established maintenance schedules, and manufacturers' service contracts provide primary maintenance for many major instruments (e.g., GC/MS instruments, atomic absorption spectrometers, analytical balances, etc.). Maintenance activities for each instrument are documented in a maintenance log.

Along with a schedule for maintenance activities, an adequate inventory of spare parts is required to minimize equipment down time. This inventory emphasizes those parts (and supplies) which are subject to frequent failure, have limited useful lifetimes, or cannot be obtained in a timely manner should failure occur.

The respective laboratory managers are responsible for maintaining an adequate inventory of necessary spare parts. Sufficient equipment is on hand to continue analyses in the event that an instrument encounters problems. In addition to backup instrumentation, a supply of spare parts such as gas chromatography columns, fittings, septa; atomic absorption lamps, mirrors, diaphragms; graphite furnace tubes; and other ancillary equipment is maintained.

6.2.3 Training

The laboratory will have an established policy and procedure on training and documenting of the analyst's competency. Each staff member that performs sample preparation and analysis will demonstrate their proficiency through preparation and analysis of four LCSs as described in SW-846. Analyst will be considered proficient if the acceptance criteria for method accuracy and precision are met. The laboratory will maintain all training records on file.

6.2.4 Supplies and Consumables

The laboratory will inspect supplies and consumables prior to their use in analysis. The materials specifications in the analytical methods will be used as a guideline for establishing the acceptance criteria for these materials. Purity of reagents will be monitored by analysis of method blanks. An inventory and storage system for materials and supplies will assure use before manufacturers' expiration dates and storage under safe and chemically compatible conditions.

6.2.5 Software Quality Assurance

The generation, compilation, and reporting of electronic data are critical components of laboratory operations. To produce defensible data of known quality, the laboratory will develop a software QA plan or a SOP which describe activities related to data generation, reduction, and transfer with modern tools of data acquisition, and the policies and procedures for procurement, modification, and use of computer software.

6.2.5.1 Software Validation

The laboratory will have procedures in place to ensure that all software for data reduction, reporting, and transfer adequately and correctly performs all intended functions, and does not perform any unintended functions.

The laboratory will verify, validate, and document the proper functioning of the software immediately after any new data acquisition and/or management systems have been installed at the laboratory. The baseline verification and validation may include the following actions:

- Comparison of the computer printouts with reduced data and the raw data
- Manual calculations to confirm correctness of all computer calculations
- Comparison of analytical reports to the electronic deliverable files

Baseline software validation will be documented in laboratory QA files. Continuing software verification will take place during sample analysis. To eliminate data entry errors during

analytical sequence set-up, as part of data package review, the correctness of results will be checked by one manual calculation per QC batch during data review. This verification will be documented in the QA/QC checklist for each data file.

6.2.5.2 Software Security

Only authorized and trained laboratory personnel will have access to the operating and data management software. Each analyst will be trained in software use for operating different functional areas of the software systems and have a password that allows access to these areas.

6.2.5.3 Manual Integration

Manual integration is sometimes necessary for proper compound quantitation in cases when there are overlapping or tailing peaks, and sloping baselines. When justified, manual integration can be conducted for standards, samples and QC check samples.

Manual integration may include valley to valley baselines, vertical peak separation or slope integration. The type of manual integration is a judgement call of an analyst experienced in gas chromatography.

If a need for manual integration arises, the analysts performing analysis will select a proper approach based on their professional judgement. Manual integration will be then conducted and documented in the data file. Once an approach has been selected, it will be consistently used for the similarly affected peaks.

Manual integration documentation will include a copy of a computer-integrated chromatogram, a copy of a manually integrated chromatogram, a brief justification description, and the name of the person who performed the manual integration. The Laboratory Manager will review and approve all manual integrations performed by analysts.

6.3 Laboratory Corrective Action

Corrective action takes place when a circumstance arises that has a negative impact on the quality of the analytical data generated during sample analysis. For corrective action to be initiated, awareness of a problem must exist. In most instances, the individuals performing laboratory analyses are in the best position to recognize problems that will affect data quality. Keen awareness on their part can frequently detect minor instrument changes, drifts, or malfunctions which can then be corrected, thus preventing a major breakdown in the quality control system in place. If major problems arise, they are in the best position to recommend the proper corrective action and initiate it immediately, thus minimizing data loss. Therefore, the laboratory personnel will have a prime responsibility for recognizing a nonconformance and the

need for implementing and documenting the corrective action. If a situation arises requiring corrective action, the following closed-loop corrective action process will be used:

1. Define the problem
2. Assign responsibility for investigating the problem
3. Investigate and determine the cause of the problem
4. Determine corrective action course to eliminate the problem
5. Assign responsibility for implementing the corrective action
6. Determine the effectiveness of the corrective action and implement the correction
7. Verify that the corrective action has eliminated the problem
8. If not completely successful, return to step 1

The personnel identifying or originating a nonconformance will document it to include the following items:

- Identification of the individual(s) identifying or originating the nonconformance
- Description of the nonconformance
- Any required approval signatures
- Method (s) for corrective action or description of the variance granted
- Schedule for completing corrective action

All affected project samples will be listed on the Nonconformance/Corrective Action Report. The laboratory Project Manager will notify the IT Project Chemist of any laboratory nonconformance affecting the samples. Nonconformance/Corrective Action Reports will be submitted to IT as part of data packages. Corrective action procedures for different types of analysis are presented in Table 6 through Table 9.

6.3.1 Batch Corrective Action

Analytical laboratory processes are batch processes, and the batch is a basic unit for the frequency of some quality control elements. A batch is a group of samples of similar matrix that behave similarly with respect to the procedures being employed. The following three types of batches can be identified at the analytical laboratory:

- Preparation batch

- Instrument batch
- Sample Delivery Group (SDG)

A preparation batch is a group up to twenty field samples which are prepared (e.g., extracted or digested) simultaneously or sequentially without interruption. Samples in each batch are of similar matrix (e.g., soil, sludge, liquid waste, water), are treated in a similar manner, and are processed with the same lots of reagents. For organic compound analyses each batch will contain a method blank, a LCS, and a MS/MSD pair. For inorganic compound analyses, each batch will contain a method blank, a LCS, MS, and a SD. These QC check samples are not counted into the maximum batch size of 20.

An instrument batch is a group of samples, which are analyzed within the same analytical run sequence. If the continuous operation of an instrument is interrupted (shut down for maintenance, etc.), a new instrument batch must be started. The instrument batch includes an instrument blank, calibration check standards, extracts/digestates of the field samples and QC check samples. The number of samples in the analytical batch is not limited, but the frequency of the calibration check standard and instrument blank analysis is mandated in each particular method.

For volatile organic compound analyses by GC or GC/MS, the preparation and instrument batch are the same, since the sample preparation (purge and trap) is performed as part of the instrument analysis. For these analyses, a batch is defined as a group of up to 20 field samples that are sequentially loaded on the instrument and analyzed as a single analytical run sequence. Laboratory QC check samples (method blank, a LCS, MS/MSD pair) will be analyzed as part of the batch in addition to 20 field samples, as well as the calibration standard per method requirements.

For CLP analyses, a SDG is defined as a group of 20 or fewer samples within a project that are received over a period of 14 days or less. An SDG is primarily a reporting format and is not limited to sample receipt groups, preparation batches, or analytical batches.

Method quality control acceptance criteria determine whether a method is performing within acceptable limits of precision and accuracy. There is a method component and a "matrix" component to this determination. The method component measures the performance of the laboratory analytical processes during the sample analyses. The matrix component measures the method performance on a specific matrix. Some quality control elements uniquely measure the laboratory component of method performance but all QC elements measuring the matrix component contain the method component.

Method blanks and laboratory control samples uniquely measure the method performance. Matrix spikes, matrix spike duplicates, laboratory sample duplicates, surrogate standards, post-digestion spikes measure the matrix component of method performance.

6.3.2 Method Blank

The method blank measures laboratory introduced contamination for the sample batch and batch corrective action is initiated when contamination is found. It may include re-analysis of the blank, re-analysis of the samples, re-preparation and re-analysis of the blank, QC, and samples, and assessment of the impact of the contamination on batch sample data. Although it is a goal to have no detected target analytes in the method blanks, analytes may be periodically detected in blanks due to the nature of the analysis or the reporting limit for the analyte. For example, methylene chloride, acetone, and 2-butanone may sometimes be found in blanks for volatile organic compound analysis, and, the phthalate esters may sometimes be found in the blanks for semi-volatile organic compound analyses.

A method blank will be considered acceptable if the following conditions are met:

- Target analytes are present at concentrations less than one half of the PQLs.
- Target analytes are present at concentrations less than 5% of the regulatory limits for these analytes.
- Target analytes are present at concentrations less than 5% of the sample results for these analytes.

If the method blank results do not meet these acceptance criteria, the laboratory will initiate corrective action.

The first step of corrective action is to assess the effect on the samples. For example, if an analyte is found only in the blank but not in any of the associated samples, or if the target analyte in the blank is less than one twentieth the value in the sample, no corrective action is necessary.

If corrective action is required, the method blank and any samples containing the same contaminant will be re-analyzed. If the contamination remains, the contaminated samples of the batch would be re-extracted and re-analyzed with a new method blank and QC check samples.

6.3.3 Laboratory Control Sample

LCS must meet the accuracy acceptance criteria for target analytes for the batch to be considered acceptable. If the target analytes are outside of the acceptance limits, corrective action will be

initiated. Corrective action will include re-extraction and re-analysis of the whole batch, including method blank, samples, and QC check samples.

If matrix spikes are not conducted, a LCS/LCD pair will be analyzed with each batch of samples. If the LCS/LCD are outside method acceptance criteria for accuracy and precision, the whole batch will be re-extracted and re-analyzed, including method blank, samples, and QC check samples.

6.3.4 Matrix Spike and Matrix Spike Duplicate

An MS/MSD pair is included with each batch of samples for organic compound analyses and an MS and laboratory sample duplicate are included with each batch of samples for inorganic compound analysis. These QC check samples allow evaluating the accuracy and precision of analysis and the influence of matrix effects.

Matrix spike data evaluation is more complex than blank or LCS data evaluation since matrix spikes measure matrix effects in addition to sample preparation and analysis effects. Sample heterogeneity, lithological composition of soils, and presence of interfering chemical compounds often negatively affect accuracy and precision of analysis. If the native concentration of target analytes in the sample chosen for spiking is high relative to the spiking concentration, the differences in the native concentration between the unspiked sample and the spiked samples may contribute a significant error in the precision and accuracy. The accuracy and precision in this case are not representative of the true method and matrix performance.

If the accuracy of MS/MSD analysis is outside the acceptability limits, for any target analyte, the LCS will be evaluated. If the LCS accuracy limits are met, the MS/MSD recovery problem will be identified as matrix effect and no further action will be required. If the LCS accuracy limits are not met, corrective action will be implemented, and the affected samples and associated QC samples will be re-prepared and re-analyzed.

If the MS/MSD or sample/sample duplicate pair fail in precision due to observed matrix interferences, sample inhomogeneity or the nature of the contaminant, corrective action will not be required, and the laboratory will make an appropriate notation in the case narrative.

6.3.5 Individual Sample Corrective Action

In addition to batch corrective action, individual samples within a batch may also require corrective action. Re-extraction and re-analysis of individual samples will take place in the following situations:

- Surrogate standard recoveries are outside acceptability limits.
- Internal standard areas for GC/MS analyses are outside acceptability limits.
- Errors have been made during sample preparation, and results of analysis are not conclusive.

7.0 Data Management

This section describes the data management procedures for data review, verification, reporting and validation.

7.1 Data Reduction, Verification, and Reporting

All analytical data generated by the laboratory in support of the EFA-West RAC projects will be reviewed prior to reporting to assure the validity of reported data. This internal laboratory data review process will consist of data reduction, three levels of documented review, and reporting. Review processes will be documented using appropriate checklist forms, or logbooks, that will be signed and dated by the reviewer.

7.1.1 Data Reduction

Data reduction involves the mathematical or statistical calculations used by the laboratory to convert raw data to the reported data. Reduction of analytical data will be performed by the laboratory as specified in each of the appropriate analytical methods and laboratory SOPs. For each method, all raw data results will be recorded using method-specific forms or a standardized output from each of the various instruments.

All data calculations will be verified and initialed by personnel both generating and approving them. All raw and electronic data, notebook references, supporting documentation and correspondence will be assembled, packaged, and stored for a minimum of 10 years for future use. All reports will be held client confidential. If the laboratory is unable to store project-related data for 10 years, then it is the responsibility of the laboratory to contact IT to make alternative arrangements.

7.1.2 Laboratory Data Verification and Review

The laboratory analyst who generates the analytical data will have the primary responsibility for the correctness and completeness of data. Each step of this verification and review process will involve the evaluation of data quality based on both the results of the QC data and the professional judgment of those conducting the review. This application of technical knowledge and experience to the evaluation of data is essential in ensuring that data of known quality are generated consistently. All data generated and reduced will follow well-documented in-house protocols.

Level 1. Technical (Peer) Data Review—Analysts will review the quality of their work based on an established set of guidelines, including the QC criteria established in each method, in this QC Plan and as stated within the laboratory QA Manual. This review will, at a minimum, ensure that the following conditions have been met:

- Sample preparation information is correct and complete.
- Analysis information is correct and complete.
- Appropriate SOPs have been followed.
- Calculations are verified.
- There are no data transposition errors.
- Analytical results are correct and complete.
- QC samples are within established control limits.
- Blanks and laboratory control samples are within appropriate QC limits.
- Special sample preparation and analytical requirements have been met.
- Documentation is complete, for example any anomalies and holding times have been documented and forms have been completed.

Level 2. Technical Data Review—This review will be performed by a supervisor or data review specialist whose function is to provide an independent review of data packages. This review will also be conducted according to an established set of guidelines and will be structured to verify the following finding of Level 1 data review:

- All appropriate laboratory SOPs have been followed.
- Calibration data are scientifically sound, appropriate to the method, and completely documented.
- QC samples are within established guidelines.
- Qualitative identification of contaminants is correct.
- Manual integrations are justified and properly documented.
- Quantitative results and calculations are correct.
- Data are qualified correctly.
- Documentation is complete, for example, any anomalies and holding times have been documented and appropriate forms have been completed.

- Data are ready for incorporation into the final report.
- The data package is complete and is in compliance with contract requirements.

The Level 2 review will be structured so that all calibration data and QC sample results are reviewed and all of the analytical results from at least 10% of the samples are checked back to the sample preparation and analytical bench sheets. If no problems are found with the data package, the review will be considered complete.

If any problems are found with the data package, an additional 10% of the sample results will be checked back to the sample preparatory and analytical bench sheets. This cycle will then be repeated until either no errors are found in the data set checked or until all data have been checked. All errors and corrections noted will be documented.

Level 3. Administrative (QA) Data Review—The Laboratory QA Manager will review 10% of all data packages. This review should be similar to the review as provided in Level 2 except that it will provide a total overview of the data package to ensure its consistency and compliance with project requirements. All errors noted will be corrected and documented.

7.1.3 Data Reporting

This section details the requirements for data reporting and data package formats which will be provided by the laboratory. All definitive soil results will be reported on a dry weight basis. Soil and water units are presented in Table 2 through Table 5.

Hard copy deliverables—All relevant raw data and documentation, including (but not limited to) logbooks, data sheets, electronic files, final reports, etc., will be maintained by the laboratory for at least 7 years. IT will be notified 30 days before disposal of any relevant laboratory records.

IT will maintain copies of all COC forms until receipt of the laboratory report. Laboratory reports will be logged in upon receipt and filed in chronological order. The second copy of the report will be sent for third-party data validation.

Data packages will be prepared to meet the requirements for data package contents that are presented in Table 10 through Table 12. All confirmation samples will be provided as 90% Level III and 10% Level IV data packages. All waste characterization samples will require a standard laboratory package only.

7.1.4 Electronic Deliverables

The electronic data deliverable (EDD) will be in IT Environmental Management System (ITEMS) format. The analytical laboratory will follow the requirement stated in the Laboratory Interface Document for the Analytical Laboratory Electronic Data Deliverable. At project closeout, IT will submit a NEDTS compatible electronic file to the Navy.

The laboratory will certify that the EDD and the hard copy reports are identical. Both the EDD and the hard copy will present results to two or three significant figures. For inorganic results, two significant figures will be used for results that are less than 10, and three significant figures will be used for results that are greater than 10. For organic results, one significant figure will be used for results that are less than 10, and two significant figures will be used for results that are greater than 10. The EDD for each sample delivery group will be due at the same time as the hard copy, 14 calendar days after the last sample of the sample delivery group has been delivered to the laboratory.

Field information (date and time collected, sample identification, etc.) will be entered directly into the main database from the COC form or uploaded from electronic files generated in the field.

Upon receipt by the ITEMS Data Manager, electronic data will be uploaded into a temporary access database. The uploaded data will be printed and proofread relative to the hard copy submitted by the laboratory. The reader will also check for irregularities in analyte identities, concentrations, and units. The uploaded data will also be processed to compare the fields against a list of required values. If any errors are returned by the program, the file will be manually edited or regenerated by the laboratory. If no errors are returned, the data will be uploaded into the main database. The laboratory database will be merged with the field database, and reports will be generated from the merged database.

7.2 Data Validation

Ten percent of all soil and groundwater samples will be validated as Level IV. All remaining samples will require a Level III review only. Data review and validation data will be performed by an independent data validation company. The validation will be in accordance with CLP National Functional Guidelines for Inorganic Data Review (EPA, 1994) and CLP National Functional Guidelines for Organic Data Review (EPA, 1999d), SWDIV Environmental Work Instruction No. 1—Chemical Data Validation (SWDIV, 1999), and the QC criteria specified in this document. Data will be validated and flagged with data qualifiers shown in Table 13, “Data Qualifiers.”

The data validation company will have the following qualifications:

- A minimum of 5 years of experience in the environmental data validation business.
- Prior experience on Navy Remedial Action Contract or Comprehensive Long-Term Environmental Action projects.
- Navy data validation experience.
- Active peer review program.

Personnel must have the following qualifications:

- Data Reviewer:
 - Bachelor of Science degree or higher in chemistry or related field.
 - 5 years of combined experience with approximately 2 years in data validation and 3 years conducting laboratory analysis in an environmental laboratory using the EPA-approved methods being validated.
- Peer Reviewer:
 - Bachelor of Science degree or higher in chemistry or related field.
 - 5 years of combined experience with approximately 2 years in data validation and 3 years conducting laboratory analysis in an environmental laboratory using the EPA-approved methods being validated.

7.3 Data Review

The Project Chemist will review the standard laboratory data packages to establish that the holding times for extraction and analysis, the calibration and internal QC check requirements have been met.

7.4 Data Quality Assessment Report

Based on data validation/review, the Project Chemist will determine if the project DQOs have been met, and will calculate data completeness. To reconcile the collected data with project DQOs and to establish and document data usability, the Project Chemist will prepare a Data Quality Assessment Report (DQAR). The DQAR will discuss the following topics:

- Implementation of sampling design and analysis according to the approved SAP (or sample completeness and representativeness).
- Proper frequency of field QC samples and the adequacy of field decontamination procedures.
- Accuracy and precision of the data collected.

- Data comparability, if appropriate.
- Data usability for project decisions.

The DQAR will be included into the Final Project Report.

8.0 Quality Assurance Oversight

QA oversight for this project will include system audits of field activities and of the laboratory subcontracted by the Navy to perform the analysis.

8.1 Laboratory Assessment and Oversight

IT will perform systems and performance audits as independent assessments of sample collection and analysis procedures. The systems audit is a qualitative review of the overall sampling or measurement system, while the performance audit is a quantitative assessment of a measurement system.

Audit results are used to evaluate if the analytical laboratories are able to produce data that fulfill the objectives established for the program and identify any areas requiring corrective action.

8.1.1 Naval Facilities Engineering Service Center Laboratory Audits

The laboratory will successfully complete a NFESC laboratory audit. A NFESC audit conducted in the past for a different project is an acceptable qualification.

8.1.2 Technical Systems Audits

A technical systems audit is an on-site, qualitative review of the sampling or analytical system to ensure that the activity is being performed in compliance with the SAP specifications, and that the collected data fulfill the project DQOs.

Laboratories performing under this program may be required to have a pre-qualification (or periodic) systems audit performed by IT depending on the scope of services to be provided, past performance, or other factors indicating a need to evaluate quality in this manner. Subsequently, the laboratories will respond to and address any project or technical concerns resulting from the audits. A follow-up audit may be performed to verify resolution of findings and observations as well as review the corrective measures taken. Laboratories found deficient will not be used on a project until the deficiencies are corrected and the laboratory accepted. Laboratories previously qualified for the types of testing to be performed on the project will not require pre-qualification provided that pre-qualification has been within the past year and the work performed has been acceptable.

The laboratory systems audit results will be used to review laboratory operations and to ensure that any outstanding corrective actions have been addressed. A laboratory systems audit will include the following critical areas:

- Sample custody procedures
- Calibration procedures and documentation
- Completeness of data forms, notebooks, and other reporting requirements
- Data review procedures
- Storage, filing, and record keeping procedures
- QC procedures and documentation
- Operating conditions of facilities and equipment
- Documentation of training and maintenance activities
- Systems and operations overview
- Security of laboratory automated systems

After the audit, a debriefing session will be held for all participants to discuss the preliminary audit results. The auditor will then complete the audit evaluation and submit to the Project Manager and the laboratory an audit report including observations of the deficiencies and the necessary recommendations for corrective actions. Follow-up audits will be performed prior to completion of the project to ensure corrective actions have been taken.

8.1.3 Performance Evaluation Audits

Performance audits quantitatively assess the data produced by a measurement system. A performance audit involves submitting project-specific performance evaluation (PE) samples for analysis for each analytical method used in the project. The performance audit answers questions about whether the measurement system is operating within control limits and whether the data produced will meet the project DQOs. If there is a concern about the laboratory performance, or per the Navy request, IT will administer performance evaluation samples for the target analytes.

Review of PE results include the following elements:

- Correct identification and quantitation of the PE sample analytes
- Accurate and complete reporting of the results
- Measurement system operation within established acceptance limits for accuracy

The concentrations reported for the PE samples will be compared to the known or expected concentrations spiked in the samples. The percent recovery will be calculated and the results

assessed according to the acceptance limits, which are based on inter-laboratory studies. If the accuracy criteria are not met, the cause of the discrepancy will be investigated, and a second PE sample will be submitted. PE sample results review will be documented in a report to the Project Manager.

8.1.4 Magnetic Tape Audits

Magnetic tape audits involve the examination of the electronic media used in the analytical laboratory to acquire, report, and store data. These audits are used to assess the authenticity of the data generated, and assess the implementation of good automated laboratory practices. IT may perform magnetic tape audits of the laboratory when warranted by project PE samples results, or by other circumstances.

8.1.5 Performance Evaluation Sample Programs

The off-site laboratory will participate in the EPA PE Water Supply and Water Pollution Studies programs or equivalent programs for state certifications. Satisfactory performance in these PE programs also demonstrate proficiency in methods used to analyze project samples. The laboratory will document the corrective actions to unacceptable PE results to demonstrate resolution of the problems.

8.2 Field Audits

The IT and SWDIV QA Officers may schedule audits of field activities at any time to evaluate the execution of sample collection, identification, and control in the field. The audit will also include observations of COC procedures, field documentation, instrument calibrations, and field measurements.

Field documents and COC forms will be reviewed to ensure that all entries are printed or written in indelible ink, dated, and signed.

Sampling operations will be reviewed and compared to the FSP, the QAPP, and other applicable SOPs. The auditor will verify that the proper sample containers are used, the preservatives are added or are already present in the container, and the documentation of the sampling operation is adequate.

Field measurements will be reviewed by random spot-checking to determine that the instrument is within calibration, that the calibration is done at the appropriate frequency, and that the sensitivity range of the instrument is appropriate for the project.

Audit findings will be documented in a report to the IT Program QC Manager and the Project Manager. Corrective action will be implemented as necessary.

8.3 QAPP Revision or Amendment

When circumstances arise that impact the original project DQOs, such as a significant change in work scope, the QAPP document will be revised or amended. The modification process will be based on EPA guidelines, and direction from the Navy and QA Officer.

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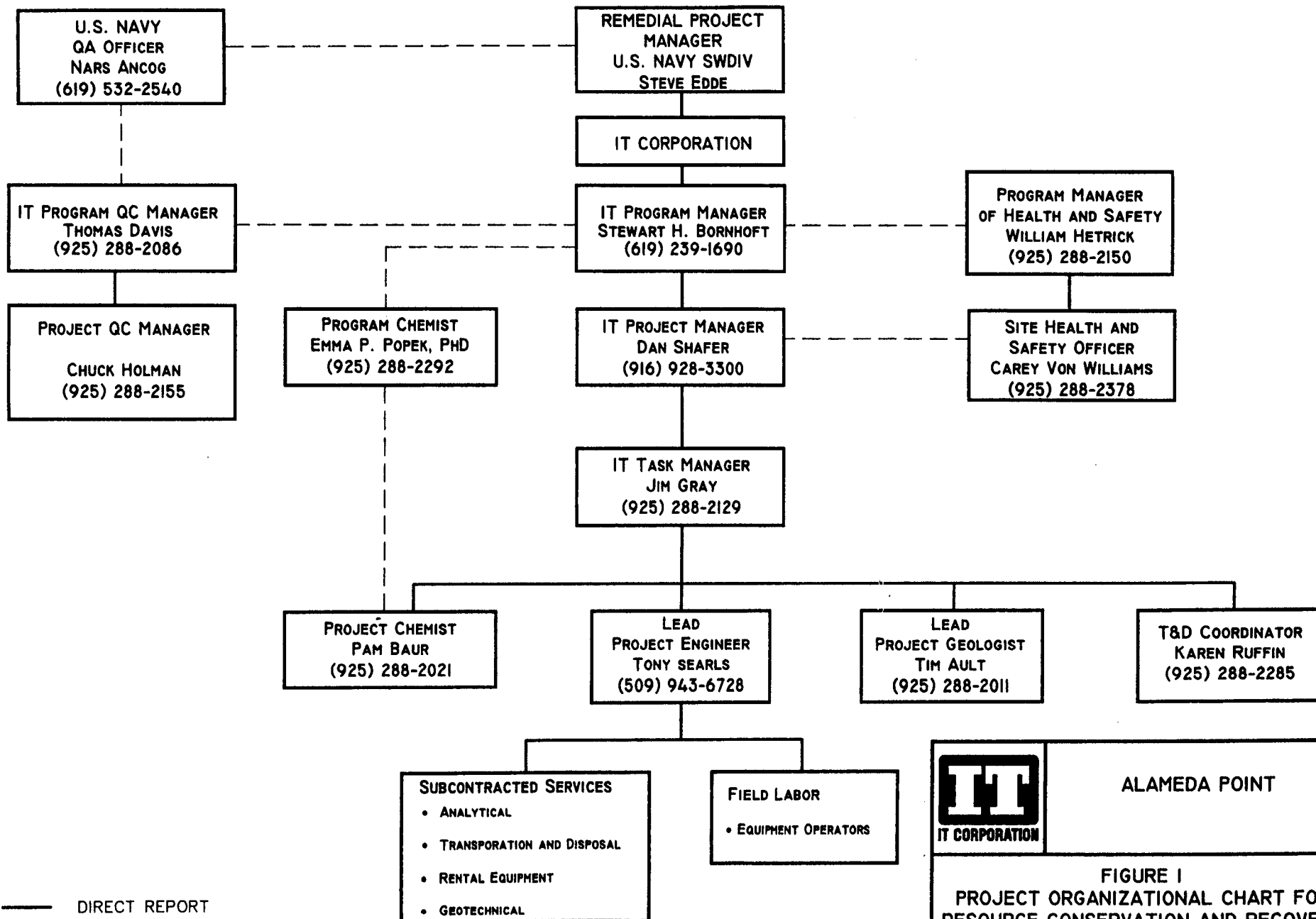
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FIGURES

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
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— DIRECT REPORT
- - - LINE OF COMMUNICATION



ALAMEDA POINT

FIGURE 1
PROJECT ORGANIZATIONAL CHART FOR
RESOURCE CONSERVATION AND RECOVERY
ACT EXCAVATIONS
DELIVERY ORDER 0013



INTERNATIONAL
TECHNOLOGY
CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD *

Reference Document No. 545664
Page 1 of ____

Project Name/No. ¹ _____ Samples Shipment Date ⁷ _____
Sample Team Members ² _____ Lab Destination ⁸ _____
Profit Center No. ³ _____ Lab Contact ⁹ _____
Project Manager ⁴ _____ Project Contact/Phone ¹² _____
Purchase Order No. ⁶ _____ Carrier/Waybill No. ¹³ _____
Required Report Date ¹¹ _____

Bill to: ⁵ _____
Report to: ¹⁰ _____

ONE CONTAINER PER LINE

Sample ¹⁴ Number	Sample ¹⁵ Description/Type	Date/Time ¹⁰ Collected	Container ¹⁷ Type	Sample ¹⁸ Volume	Pre- ¹⁹ servative	Requested Testing ²⁰ Program	Condition on ²¹ Receipt	Disposal ²² Record No.
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	

Special Instructions: ²³ _____

Possible Hazard Identification: ²⁴

Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: ²⁵

Return to Client ☐ Disposal by Lab ☐ Archive _____ [mos.]

Turnaround Time Required: ²⁶

Normal ☐ Rush ☐

QC Level: ²⁷

I ☐ II ☐ III ☐ Project Specific (specify): _____

1. Relinquished by ²⁸
(Signature/Affiliation)

Date: _____
Time: _____

1. Received by ²⁸
(Signature/Affiliation)

Date: _____
Time: _____

2. Relinquished by
(Signature/Affiliation)

Date: _____
Time: _____

2. Received by
(Signature/Affiliation)

Date: _____
Time: _____

3. Relinquished by
(Signature/Affiliation)

Date: _____
Time: _____

3. Received by
(Signature/Affiliation)

Date: _____
Time: _____

Comments: ²⁹ _____

FIGURE 2
Chain-of-Custody Record

DRAFT QUALITY ASSURANCE PROJECT PLAN

FIGURE 3 – CUSTODY SEAL

FIELD SAMPLING INVESTIGATION PLAN
BUILDING 360 INDUSTRIAL WASTEWATER
TREATMENT PLANT AND SOUTHEAST CORNER
OF BUILDING 5

THE ABOVE IDENTIFIED FIGURE IS NOT
AVAILABLE.

EXTENSIVE RESEARCH WAS PERFORMED BY
SOUTHWEST DIVISION TO LOCATE THIS FIGURE.
THIS PAGE HAS BEEN INSERTED AS A
PLACEHOLDER AND WILL BE REPLACED
SHOULD THE MISSING ITEM BE LOCATED.

QUESTIONS MAY BE DIRECTED TO:

DIANE C. SILVA
RECORDS MANAGEMENT SPECIALIST
NAVAL FACILITIES ENGINEERING COMMAND
SOUTHWEST
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132

TELEPHONE: (619) 532-3676

TABLES

Table 1
Project Personnel and Chemical Data Collection Responsibilities

Position	Responsibility
U.S. Navy QAO	<p>Provides governmental oversight of the IT QA Program.</p> <p>Provides quality-related directives through Contracting Officer's Technical Representative.</p> <p>Provides technical and administrative oversight of IT surveillance audit activities.</p> <p>Point of contact for all matters concerning QA and the Navy's Laboratory QA Program.</p> <p>Prepares governmental budget estimates for all QA functions included in IT contracts.</p> <p>Coordinates training on matters pertaining to generation and maintenance of quality of data.</p> <p>Authorized to suspend project execution if QA requirements are not adequately followed.</p>
Program Chemist	<p>Reviews and approves the SAP.</p> <p>Guides the selection of subcontract analytical laboratories.</p> <p>Conducts field and laboratory audits.</p> <p>Serves as a point of contact for the EFA-West QAO.</p> <p>Develops corrective action as required.</p> <p>Serves as a technical advisor to the project.</p>
Project Chemist	<p>Develops the project DQOs and prepares the SAP.</p> <p>Selects qualified subcontract laboratories.</p> <p>Implements chemical data QC procedures and performs auditing of field performance.</p> <p>Reviews laboratory data prior to use.</p> <p>Coordinates data validation of laboratory data.</p> <p>Reviews data validation report.</p> <p>Prepares the appropriate sections of the report summarizing the project activities.</p>
Field Technician	<p>Performs all sampling in accordance with approved SAP.</p> <p>Ensures that field QC samples are collected as specified in the FSP.</p> <p>Completes field documentation.</p> <p>Coordinates laboratory and field sampling activities.</p> <p>Implements field corrective actions as required.</p>

Table 2
Reporting Limits
EPA Method 8260B (Volatile Organic Compounds)

Compound name	Water, µg/L	Soil, µg/kg
Benzene	2.0	5.0
Bromodichloromethane	2.0	5.0
Bromoform	2.0	10
Bromomethane	2.0	5.0
Carbon Tetrachloride	2.0	5.0
Chlorobenzene	2.0	5.0
Chloroethane	2.0	10
Chloroform	2.0	5.0
Dibromochloromethane	2.0	5.0
Dichloromethane (Methylene Chloride)	2.0	5.0
1,2-Dichloroethane	2.0	5.0
1,2-Dichloropropane	2.0	5.0
1,1-Dichloroethane	2.0	5.0
1,1-Dichloroethene	2.0	5.0
cis-1,2-Dichloroethene	2.0	5.0
trans 1,2-Dichloroethene	2.0	5.0
cis-1,3-Dichloropropene	2.0	5.0
trans-1,3-Dichloropropene	2.0	5.0
Ethylbenzene	2.0	5.0
Styrene	2.0	5.0
1,1,2,2-Tetrachloroethane	2.0	5.0
Tetrachloroethene	2.0	5.0
Toluene	2.0	5.0
1,1,1-Trichloroethane	2.0	5.0
1,1,2-Trichloroethane	2.0	5.0
Trichlorofluoromethane	2.0	5.0
1,1,2-Trichloro-1,2,2-trifluoroethane	2.0	5.0
Trichloroethene	2.0	5.0

Table 2 (Continued)
Reporting Limits
EPA Method 8260B (Volatile Organic Compounds)

Compound name	Water, µg/L	Soil, µg/kg
Vinyl acetate	2.0	5.0
Vinyl chloride	2.0	10.0
m&p-Xylenes	2.0	5.0
o-Xylene	2.0	5.0
Hazardous Substance List		
Acetone	100	100
Carbon Disulfide	100	100
2-Butanone (MEK)	100	100
4-Methyl-2-Pentanone (MIBK)	50	50
2-Hexanone	50	50

Table 3
Reporting Limits
EPA Method 8270C (Semivolatile Organic Compounds)

Compound name	Water, µg/L	Soil, µg/kg
Acenaphthene	10	330
Acenaphthylene	10	330
Anthracene	10	330
Benzo(a)pyrene	10	330
Benzo(b)fluoranthene	10	330
Benzo(g,h,i)perylene	10	330
Benzo(k)fluoranthene	10	330
Benz(a)anthracene	10	330
Benzoic acid	50	1700
Benzyl alcohol	10	330
Bis-(2-chloroethoxy)methane	10	330
Bis(2-chloroethyl)ether	10	330
Bis(2-chloroisopropyl)ether	10	330
Bis(2-ethylhexy)phthalate	10	330
4-Bromophenyl phenyl ether	10	330
Butylbenzylphthalate	10	330
Di-n-butylphthalate	10	330
4-Chloro-3-methylphenol	10	330
4-Chloroaniline	10	330
2-Chloronaphthalene	10	330
2-Chlorophenol	10	330
4-Chlorophenyl phenyl ether	10	330
Carbazole	10	330
Chrysene	10	330
Dibenz(a,h)anthracene	10	330
Dibenzofuran	10	330
1,2-Dichlorobenzene	10	330
1,3-Dichlorobenzene	10	330
1,4-Dichlorobenzene	10	330
3,3'-Dichlorobenzidine	20	660
2,4-Dichlorophenol	10	330
Diethyl phthalate	10	330

Table 3 (Continued)
Reporting Limits
EPA Method 8270C (Semivolatile Organic Compounds)

Compound name	Water, µg/L	Soil, µg/kg
2,4-Dimethyl phenol	10	330
Dimethylphthalate	10	330
4,6-Dinitro-2-methyl phenol	50	1700
2,4-Dinitrophenol	50	1700
Di-n-octyl phthalate	10	330
Fluoranthene	10	330
Fluorene	10	330
Hexachlorobenzene	10	330
Hexachlorobutadiene	10	330
Hexachlorocyclopentadiene	10	330
Hexachloroethane	10	330
Indeno(1,2,3-cd)pyrene	10	330
Isophorone	10	330
2-Methylnaphthalene	10	330
2-Methylphenol (o-Cresol)	10	330
3-Methylphenol (m-Cresol)	10	330
4-Methylphenol (p-Cresol)	10	330
Naphthalene	10	330
2-Nitroaniline	50	1700
3-Nitroaniline	50	1700
4-Nitroaniline	50	1700
Nitrobenzene	10	330
2-Nitrophenol	10	330
4-Nitrophenol	50	1700
N-Nitrosodi-n-propylamine	10	330
N-Nitrosodiphenylamine	10	330
Pentachlorophenol	50	1700
Phenanthrene	10	330
Phenol	10	330
Pyrene	10	330
Pyridine	10	330
1,2,4-Trichlorobenzene	10	330

Table 3 (Continued)
Reporting Limits
EPA Method 8270C (Semivolatile Organic Compounds)

Compound name	Water, µg/L	Soil, µg/kg
2,4,5-Trichlorophenol	50	1700
2,4,6-Trichlorophenol	10	330

Table 4
Reporting Limits
Metal Analyses

Metal	Water, µg/L	Soil, µg/kg
EPA Method 6010B (ICAP)		
Antimony (Sb)	50	10
Arsenic (As)	50	5.0
Barium (Ba)	100	10
Beryllium (Be)	2.0	0.2
Cadmium (Cd)	2.0	0.2
Chromium (Cr)	10	1.0
Cobalt (Co)	10	1.0
Copper (Cu)	10	1.0
Lead (Pb)	5.0	1.0
Molybdenum (Mo)	100	5.0
Nickel (Ni)	40	4.0
Selenium (Se)	20	10
Silver (Ag)	5.0	1.0
Thallium (Tl)	10	1.0
Vanadium (V)	10	1.0
Zinc (Zn)	20	2.0
EPA Method 7470A/7471A (Cold Vapor Technique)		
Mercury (Hg)	0.02	0.2

Table 5
Reporting Limits
Total Petroleum Hydrocarbons and Oil and Grease

Analyte	Water, µg/L	Soil, mg/kg
Total Petroleum Hydrocarbons EPA Method 8015B		
Gasoline	500	1.0
Diesel	500	10
Motor Oil	1,000	100
Oil and Grease EPA Method 418.1		
Oil and Grease	1,000	10

Table 6
Summary of Calibration Requirements, QC Procedures, and Corrective Action for
Chromatography Methods Conducted per the Test Methods for Evaluating Solid Waste
(SW-846), Update III

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Five-point initial calibration for target analytes	Initial calibration prior to sample analysis	Target analyte CF or RF RSD less than or equal to 20% ¹ Mean CF or RF RSD less than or equal to 20% ¹	Correct problem, then repeat initial calibration.
Second-source calibration verification	Once per five-point initial calibration	Less than 20% difference for most target analytes, 25% for difficult compounds	Correct problem, then repeat initial calibration.
Daily calibration verification	Before sample analysis and every 10 samples or every 12 hours, as specified by the method	Less than 15% difference for all target analytes	Correct problem, then repeat initial calibration.
Demonstrate ability to generate acceptable accuracy and precision using four replicate analyzes of a QC check sample	Once	QC acceptance criteria per method's requirements	Re-calculate results; locate and fix the problem, if exists, re-run demonstration of those analytes that did not meet acceptance criteria.
Retention time window study	Establish initially, verify during daily calibrations	Within ± 3 standard deviations of each analyte retention time from the initial study.	Correct problem, re-evaluate analyte identification.
8081A: DDT and Endrin breakdown check	Daily prior to analysis of samples and every 10 samples	Degradation $\leq 15\%$	Clean the system, repeat breakdown check.
Internal standards (optional)	Every sample, spiked sample, standard, and method blank	Laboratory established QC acceptance criteria	Correct problem, re-extract and re-analyze affected samples.
Method blank	One per analytical batch (VOCs) and one per preparation batch (SVOCs)	No analytes detected above the RL	Correct problem, then re-extract and re-analyze method blank and all samples processed with the contaminated blank.
MS/MSD	One MS/MSD pair conducted on Navy samples per each analytical/preparation batch	Advisory recovery limits: 70% to 130%	Identify problem. If not related to matrix interference, re-extract and re-analyze MS/MSD and all associated batch samples.
LCS or LCS/LCD pair if there is not enough sample for MS/MSD	One LCS or LCS/LCD pair per analytical/preparation batch	Advisory recovery limits: 70% to 130%	Correct problem, then re-extract and re-analyze the LCS and all associated batch samples.
Surrogate standards	Every sample, spiked sample, standard, and method blank	Advisory recovery limits: 70-130%	Correct problem, then re-extract and re-analyze all affected samples.
MDL study	Once per 12-month period	Detection limits established will be below the RLs	Correct problem, repeat the MDL study.

¹If RSD for any analyte is > 20%, regression fit may be used for the calibration curve for that analyte. Acceptance criteria for first order regression is $r^2 \geq 0.99$.

Table 7

Summary of Calibration Requirements, QC Procedures, and Corrective Action for EPA Methods 8260B and 8270C Methods Conducted per the Test Methods for Evaluating Solid Waste (SW-846), Update III

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Five-point initial calibration for target analytes.	Initial calibration prior to sample analysis	8260B: The minimum average SPCC RF for Chloromethane, 1,1-Dichloroethane, Bromoform is 0.1; for Chlorobenzene and 1,1,2,2-Tetrachloroethane is 0.30. 8270C: The minimum average SPCC RF is 0.050. 8260B and 8270C: RSD is less than or equal to 15% for target analytes, and is less than or equal to 30% for CCC ¹	Correct problem, then repeat initial calibration.
Second-source calibration verification	Once per five-point initial calibration	Less than 25% difference for all target analytes and CCCs	Correct problem, then repeat initial calibration.
Daily calibration verification	Before sample analysis and every 12 hours of analysis time	Less than 20% difference for all target analytes and CCCs	Correct problem, then repeat initial calibration.
Demonstrate ability to generate acceptable accuracy and precision using four replicate analyzes of a QC check sample	Once	QC acceptance criteria per method's requirements	Re-calculate results; locate and fix the problem, if exists, re-run demonstration of those analytes that did not meet acceptance criteria.
Check of mass spectral ion intensities (tuning procedure) using BFB (8260B) and DFTPP (8270C)	Prior to initial calibration and calibration verification	Must meet the method's requirements before samples are analyzed	Re-tune instrument and verify the tune acceptability.
Internal Standards	During data acquisition of calibration standard, samples and QC check samples	Areas within -50% to +100% of last calibration verification (12 hours) for each	Inspect mass spectrometer and GC for malfunctions; mandatory reanalysis of samples analyzed while system was malfunctioning.
Method blank	One per analytical batch (8260B) and one per preparation batch (8270C)	No analytes detected above the RL	Correct problem, then re-extract and re-analyze method blank and all samples processed with the contaminated blank.
MS/MSD	One MS/MSD pair conducted on Navy samples per analytical/preparation batch	Advisory recovery limits: 70% to 130%	Identify problem. If not related to matrix interference, re-extract and re-analyze MS/MSD and all associated batch samples.
LCS or LCS/LCD pair if there is not enough sample for MS/MSD	One LCS or LCS/LCD per analytical/preparation batch	Advisory recovery limits: 70% to 130%	Correct problem, then re-extract and re-analyze the LCS (LCS/LCD) and all associated batch samples.

Table 7 (Continued)

Summary of Calibration Requirements, QC Procedures, and Corrective Action for EPA Methods 8260B and 8270C Methods Conducted per the Test Methods for Evaluating Solid Waste (SW-846), Update III

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Surrogate standards	Every sample, spiked sample, standard, and method blank	QC acceptance criteria per method's requirements (per Method 8260B Table 8 and Method 8270A Table 8 ²)	Correct problem, then re-extract and re-analyze all affected samples.
MDL study	Once per 12-month period	Detection limits established will be below the RLs	Correct problem, repeat the MDL study.

¹ If RSD for any analyte is >15%, regression fit may be used for the calibration curve for that analyte. Acceptance criteria for first order regression is $r^2 \geq 0.99$.

² For Method 8270C use the surrogate standard acceptance criteria of Method 8270A, Revision 1, July 1992.

Table 8

Summary of Calibration Requirements, QC Procedures, and Corrective Action for EPA Method 6010B Conducted per the Test Methods for Evaluating Solid Waste (SW-846), Update III

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Initial calibration (IC) per manufacturer's instructions with a minimum of one standard and a calibration blank	Initial calibration prior to sample analysis	Accepted if the initial calibration verification (ICV) passes	Correct problem, repeat initial calibration.
Second-source ICV, prepared at the calibration mid-point	Once per initial calibration	Less than 10% difference from IC for all target analytes	Correct problem, repeat initial calibration.
Continuing calibration verification (CCV), same source as IC	Following IC, after every 10 samples and the end of the sequence	Less than 10% difference from IC for all target analytes; $\leq 5\%$ RSD for a minimum of two integrations	Correct problem, repeat initial calibration.
Calibration Blank	After IC, before CCV calibration, after every 10 samples, and at the end of the sequence	All target analytes are within three times the IDLs	Prepare and analyze the blank again, re-calibrate the instrument.
Demonstrate ability to generate acceptable accuracy and precision using four replicate analyzes of a QC check sample	Once	QC acceptance criteria per method's requirements	Re-calculate results; locate and fix the problem, if exists, re-run demonstration of those analytes that did not meet acceptance criteria.
IDL study	Once per 12 month period	IDLs will be below the MDLs	Correct problem, repeat the IDL study.
MDL study (water only)	Once per 12 month period	MDLs will be below the RLs	Correct problem, repeat the MDL study.
Method blank	One per digestion batch	No analytes detected above the RLs	Correct problem, then prepare and analyze again the method blank and all samples processed with the contaminated blank.
Interference check solution (ICS)	At the beginning of an analytical run	Within $\pm 20\%$ of expected value	Terminate analysis; correct problem; reanalyze ICS; reanalyze all affected samples.
MS/MSD for all analytes	One MS/MSD pair conducted on Navy samples per each preparation batch	QC acceptance criteria: 75% to 125% accuracy, 20% precision	Identify problem, re-prepare and re-analyze the MS/MSD pair and all samples in the associated batch.
LCS or LCS/LCD pair if there is not enough sample for MS/MSD	One LCS or LCS/LCD pair per each preparation batch	QC acceptance criteria: 75% to 125% accuracy, 20% precision	Terminate analysis, identify and correct the problem, prepare and analyze all affected samples and QC checks again.
Dilution test	Each new sample matrix	1:5 dilution must agree within $\pm 10\%$ of the original determination	Perform post digestion spike addition.

Table 8 (continued)

Summary of Calibration Requirements, QC Procedures, and Corrective Action for EPA Method 6010B Conducted per the Test Methods for Evaluating Solid Waste (SW-846), Update III

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Method of standard addition (MSA), single or multi-level	When interferences are suspected or and for new sample matrix	Linearity of a multi-level MSA	Correct problem, repeat MSA.
Post digestion spike addition	When dilution test fails	Recovery within 75% to 125% of expected results	Correct problem, reanalyze post digestion spike addition.

Table 9

Summary of Calibration Requirements, QC Procedures, and Corrective Action for EPA Method 7000A Conducted per the Test Methods for Evaluating Solid Waste (SW-846), Update III

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Initial multi-point calibration (IC) with a minimum of three standards and a calibration blank	Initial calibration prior to sample analysis	Correlation coefficient >0.995; accepted if the initial calibration verification (ICV) passes	Correct problem, repeat initial calibration.
Second-source ICV, prepared at the calibration mid-point	Once per initial calibration	Less than 10% difference from IC for all target analytes	Correct problem, repeat initial calibration.
Continuing calibration verification (CCV), same source as IC	After every 10 samples and at the end of the sequence	Less than 20% difference from IC for all target analytes	Correct problem, re-analyze previous 10 samples.
Calibration Blank	After IC, before CCV calibration, after every 10 samples, and at the end of the sequence	All target analytes not detected above the PQLs	Prepare and analyze the blank again, re-calibrate the instrument.
Demonstrate ability to generate acceptable accuracy and precision using four replicate analyzes of a QC check sample	Once	QC acceptance criteria per method's requirements	Re-calculate results; locate and fix the problem, if exists, re-run demonstration of those analytes that did not meet acceptance criteria.
MDL study (water only)	Once per 12 month period	MDLs will be below the PQLs	Correct problem, repeat the MDL study.
Method blank	One per digestion batch	No analytes detected above the PQLs	Correct problem, then prepare and analyze again the method blank and all samples processed with the contaminated blank.
MS/MSD for all analytes	One MS/MSD pair conducted on Navy samples per each preparation batch	QC acceptance criteria: 80-120% accuracy, 20% precision	Identify problem. If not related to matrix interference, re-extract and re-analyze MS/MSD and all associated batch samples.
LCS or LCS/LCD pair if there is not enough sample for MS/MSD	One LCS or LCS/LCD pair per each preparation batch	QC acceptance criteria: 80-120% accuracy, 20% precision	Correct problem, -re-digest and re-analyze LCS/LCD pair and the affected batch.
Dilution test	One sample per batch	1:5 dilution must agree within $\pm 10\%$ of the original determination	Perform post digestion spike addition.
Post digestion spike addition (recovery test)	When dilution test fails	Recovery within 85% to 115% of expected results	Conduct MSA test.
Method of standard addition (MSA), single or multi-level	When post-digestion spike addition fails	Linearity of a multi-level MSA	Correct problem, repeat MSA.

Table 10
GC/MS Data Deliverables Package Requirements

Method	Deliverable Requirement	Equivalent EPA Form	CLP or CLP-like Package Level IV	SW-846 Package, Level III	Standard Laboratory Report
Organic Analysis by GC/MS	Case Narrative		X	X	X
	Corrective Action Report(s)		X	X	X
	Cross-reference of field sample numbers, laboratory IDs, and analytical QC batches		X	X	X
	Chain-of-Custody Form, Cooler Receipt Form		X	X	X
	Sample log-in sheet	DC-1	X		
	Complete SDG file inventory sheet	DC-2-1	X		
	Data summary for each blank and sample ⁽¹⁾	I	X	X	X
	Tentatively identified compounds (TICs) for each sample (ten peaks)	I, TIC	X	X	
	Lab Control Sample/Laboratory Control Duplicate (LCS/LCD) report (including concentration spiked, percent recovered, percent recovery acceptance limits, relative percent difference (RPD), and RPD acceptance limits)	III (modified)	X	X	X
	Surrogate recovery report (including concentration spiked, percent recovered, and percent recovery acceptance limits)	II	X	X	X
	Matrix Spike/Matrix Spike Duplicate (MS/MSD) report (including concentration spiked, percent recovered, percent recovery acceptance limits, RPD, and RPD acceptance limits)	III	X	X	X
	Instrument performance check (tuning) report	V	X	X	
	Initial calibration data (including acceptance limits)	VI	X	X	
	Continuing calibration data (including acceptance limits)	VII	X	X	
	Internal standard areas and retention time reports (including acceptance limits and out-of-control flags)	VIII	X	X	
	Reconstructed ion chromatogram for each sample and rerun, blank, spike, duplicate, and standard		X	X	
	Instrument quantitation report		X	X	
	Raw and background subtracted mass spectra for each target analyte found		X	X	
	Mass spectra of TICs with library spectra of 5 best-fit matches		X		
	Sample preparation bench sheets		X	X	
	Gel permeation chromatography (GPC) clean-up logs		X		
	Method blank summary	IV	X		
	Standard preparation logs		X	X	
	Analysis run logs	VIII	X	X	
	Percent moisture		X	X	X
	pH		X (2)		

1) Must include: field sample ID, laboratory ID, date/time sampled, date received, extracted/analyzed, Practical Quantitation Limits, Method Detection Limit, dilution factor(s), results, comments, approval signature/date.

2) For water samples volatile analysis only.

Table 11
GC or HPLC Data Deliverables Package Requirements

GC/HPLC	Deliverable Requirement	Equivalent EPA Form	CLP or CLP-like Package, Level IV	SW-846 Package, Level III	Standard Laboratory Report
Organic Analysis by GC or HPLC	Case Narrative		X	X	X
	Corrective Action Report(s)		X	X	X
	Cross-reference of field sample numbers, laboratory IDs, and analytical QC batches		X	X	X
	Chain-of-Custody Form, Cooler Receipt form		X	X	X
	Sample log-in sheet	DC-1	X		
	Complete SDG file inventory sheet	DC-2-1	X		
	Data summary for each blank and sample (1)	I	X	X	X
	Lab Control Sample/Laboratory Control Duplicate (LCS/LCD) report (including concentration spiked, percent recovered, percent recovery acceptance limits, relative percent difference (RPD), and RPD acceptance limits)	III (modified)	X	X	X
	Surrogate recovery report (including concentration spiked, percent recovered, and percent recovery acceptance limits)	II	X	X	X
	Matrix Spike/Matrix Spike Duplicate (MS/MSD) report (including concentration spiked, percent recovered, percent recovery acceptance limits, RPD, and RPD acceptance limits)	III	X	X	X
	Initial calibration data for each column (indicate which column was used for quantitation)	VI	X	X	
	Continuing calibration data (indicate which column was used for quantitation) and calibration verification data	VII	X	X	
	Chromatograms for each sample (and reruns), confirmation runs, blank, spike, duplicate, and standards		X	X ⁽²⁾	
	Instrument quantitation report		X	X	
	Method blank summary	IV	X		
	Pesticide identification summary	X	X		
	Sample preparation bench sheets		X	X	
	Gel permeation chromatography (GPC) clean-up logs		X		
	Standard preparation logs		X	X	
	Analysis run logs	VIII	X	X	
	Percent moisture		X	X	X

1) Must include: field sample ID, laboratory ID, date/time sampled, date received, extracted/analyzed, Practical Quantitation Limit, Method Detection Limit, dilution factor(s), comments, approval signature/date. Results from the primary and secondary columns/detector shall be reported.

2) For petroleum fuels or PCB analyses chromatograms for samples with compound detection only.

Table 12
Metals Data Deliverables Package Requirements

Method	Deliverable Requirement	Equivalent EPA Form	CLP or CLP-like Package, Level IV	SW-846 Package, Level III	Standard Laboratory Report
Metals Analysis	Case Narrative		X	X	X
	Corrective Action Report(s)		X	X	X
	Cross-reference of field sample numbers, laboratory IDs, and analytical QC batches		X	X	X
	Chain-of-Custody Form, Cooler Receipt form		X	X	X
	Sample log-in sheet	DC-1	X		
	Complete SDG file inventory sheet	DC-2-1	X		
	Data summary for each blank and sample ⁽¹⁾	I-IN	X	X	X
	Lab Control Sample/Laboratory Control Duplicate (LCS/LCD) report (including concentration spiked, percent recovered, percent recovery acceptance limits, relative percent difference (RPD), and RPD acceptance limits)	VII-IN	X	X	X
	Matrix Spike/Matrix Spike Duplicate (MS/MSD) report (including concentration spiked, percent recovered, percent recovery acceptance limits, RPD, and RPD acceptance limits)	V (Part 1)-IN	X	X	X
	Post-digestion spike recovery	V (Part 2)-IN	X	X	X
	Duplicate sample report	VI-IN	X	X	X
	Blank results	III-IN	X	X	X
	Initial and continuing calibration data	II (PART I)-IN	X	X	
	ICP interference check sample report	IV-IN	X	X	
	Standard addition results	VIII-IN	X	X	
	ICP serial dilution results	IX-IN	X		
	Preparation logs	XIII-IN	X	X	
	Analysis run logs	XIV-IN	X	X	
	Standard preparation logs		X	X	
	CRDL standard report	II (Part 2)-IN	X		
	Instrument detection limits	X-IN	X		
	ICP interelement correction factors	XI-IN	X	X	
	Data and instrument printouts		X		
	Percent moisture		X	X	X
	pH		X ⁽²⁾		

1) Must include: field sample ID, laboratory ID, date/time sampled, date received, extracted/analyzed, Practical Quantitation Limit, Method Detection Limit, dilution factor(s), results, comments, approval signature/date.

2) For water samples only.

Table 13
Data Qualifiers

Qualifier	Description
J	The analyte was positively identified, the quantitation is an estimation. The analyte was positively identified but the associated numerical value is an estimated value above the MDL and below the PQL.
U	The analyte was analyzed for, but not detected. The associated numerical value is at or below the PQL.
R	The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.
B	The analyte was found in an associated blank, as well as in the sample.

Notes to Tables

µg/kg denotes microgram per kilogram
µg/L denotes microgram per liter
EFA denotes Engineering Field Activity
mg/kg denotes milligram per kilogram
mg/L denotes milligram per liter
BFB denotes Bromofluorobenzene
CCC denotes Calibration Check Compounds
CCV denotes continuing calibration verification
CF denotes Calibration Factor
cfu denotes colony-forming unit
DDT denotes Dichlorodiphenyltrichloroethane
DFTPP denotes Decafluorotriphenylphosphine
g denotes gram
IC denotes initial calibration
ICS denotes interference check solution
ICV denotes initial calibration verification
IDL denotes instrument detection limit
LCS/LCD denotes laboratory control sample/laboratory control duplicate
MDL denotes method detection limit
mL denotes milliliter
MS/MSD denotes matrix spike/matrix spike duplicate
MSA denotes method of standard addition
QA denotes quality assurance
QAO denotes Quality Assurance Officer
QC denotes quality control
RF denotes Response Factor
RL denotes reporting limit
RSD denotes Relative Standard Deviation
RSK denotes Robert S. Kerr
SAP denotes Sampling and Analysis Plan
SM denotes Standard Methods
SPCC denotes System Performance Check Compounds
SVOC denotes semivolatile organic compounds
VOC denotes volatile organic compounds

**SITE HEALTH AND SAFETY PLAN
FOR THE FIELD SAMPLING INVESTIGATION PLAN
BUILDING 360 INDUSTRIAL WASTEWATER TREATMENT PLANT
AND SOUTHEAST CORNER OF BUILDING 5
ALAMEDA POINT
ALAMEDA, CALIFORNIA**

**Contract No. N62474-98-D-2076
Contract Task Order No. 0013**

Submitted to:

U.S. Department of the Navy
Southwest Division
Naval Facilities Engineering Command
1220 Pacific Highway
San Diego, California 92132-5187

Submitted by:

IT Corporation
4005 Port Chicago Highway
Concord, California 94520-1120

Revision 0

August 2000

Issued to: Den Baden Date: 8/14/00



Controlled



Uncontrolled

**SITE HEALTH AND SAFETY PLAN
FOR THE FIELD SAMPLING INVESTIGATION PLAN
BUILDING 360 INDUSTRIAL WASTEWATER TREATMENT PLANT
AND SOUTHEAST CORNER OF BUILDING 5**

**ALAMEDA POINT
ALAMEDA, CALIFORNIA**

**Contract No. N62474-98-D-2076
Contract Task Order No. 0013**

Revision 0

August 2000

Approved by: _____

Jim Gray for
Daniel Shafer
IT Project Manager

Date: _____

8/10/00

Approved by: _____

William J. Hetrick
William J. Hetrick, CIH
IT Program Certified Industrial Hygienist

Date: _____

8/10/00

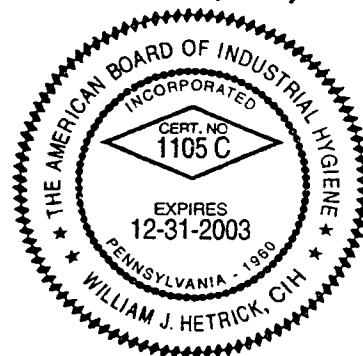


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- Attachment 2 Emergency Phone Numbers
- Attachment 3 Activity Hazard Analysis
- Attachment 4 Proposition 65 Notice and Material Safety Data Sheets
- Attachment 5 Health and Safety Checklist
- Attachment 6 Exclusion Zone Evacuation Map

Acronyms and Abbreviations

ACGIH	American Conference of Governmental Industrial Hygiene
BP	boiling point (°F)
CIH	Certified Industrial Hygienist
CPR	cardiopulmonary resuscitation
CRZ	contamination reduction zone
dBA	decibels, A-scale
EFA-West	Engineering Field Activity - West
EZ	exclusion zone
FID	flame ionization detector
FISCO	Fleet and Industrial Supply Center, Oakland
FP	flash point (°F)
IIPP	Injury and Illness Prevention Plan
IP	ionization potential (electron volts: ev)
IT	IT Corporation
IWTP	Industrial Waste Treatment Plan
LEL	lower explosive limit
mg/m	milligram(s) per cubic meter
MP	melting point (°F)
MSDS	material safety data sheets
MW	molecular weight
NAS	Naval Air Station
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PAHs	polynuclear aromatic hydrocarbons
PHSP	Program Health and Safety Plan
PID	photoionization detector
PPE	personal protective equipment
ppm	part(s) per million
PS	Project Superintendent
RAC	Remedial Action Contract
SHSP	Site Health and Safety Plan
SHSS	Site Health and Safety Specialist
Sol.	solubility in water (relative)
STEL	short-term exposure limit
SZ	support zone
TLV	threshold limit value
TWA	time weighted average
UEL	upper explosive limit (%)
VP	vapor pressure limit (mm Hg)

Policy Statement

It is the policy of IT Corporation (IT) to provide a safe and healthful work environment for all its employees. IT considers no phase of operations or administration to be of greater importance than injury and illness prevention. Safety takes precedence over expediency or shortcuts. At IT, we believe every accident and every injury is preventable. We will take every reasonable step to reduce the possibility of injury, illness, or accident.

This Site Health and Safety Plan (SHSP), in conjunction with the Engineering Field Activity (EFA)-West Remedial Action Contract (RAC) II Program Health and Safety Plan (PHSP), describes the procedures that must be followed during project operations. Operational changes which could affect the health or safety of personnel, the community, or the environment will not be made without the prior approval of the IT Program Certified Industrial Hygienist (CIH). The provisions of this SHSP are mandatory for all IT personnel, IT Project Managers, IT subcontractor personnel, Navy personnel, and visitors on this project.

Objective

The objective of this SHSP is to provide the guidelines for the delivery orders issued under contract with the Department of the Navy, EFA-West. The procedures and guidelines contained herein were based upon the best information available at the time of the plan's preparation. This SHSP describes the specific health and safety requirements and procedures to be used while conducting field work.

This SHSP has been developed for each delivery order, in combination with the PHSP and IT's Health and Safety Policy and Procedures Manual. These documents serve as the company's Injury and Illness Prevention Plan (IIPP) and Code of Safe Work Practices. Each of these documents are required to be on site and available for immediate reference. Collectively, they contain the essential elements of each project site's Health and Safety program. Section 1.0 of this SHSP describes the specific project site and the scope of work.

I understand and agree to abide by the provisions detailed in the Program Health and Safety Plan (PHSP) and this Site Health and Safety Plan (SHSP) for the activities described in the Project Investigation Plans. I understand that failure to comply with these provisions may lead to disciplinary action, which may include dismissal from the work site, termination of employment, or, for subcontractors, termination of the work contract.

[illegible]

1.0 Site Description and Scope of Work

1.1 Site Description

Naval Air Station (NAS) Alameda is located on the western end of Alameda Island, south of Oakland, primarily in Alameda County, California. Alameda Island is separated from Oakland by the Inner Harbor and Tidal Canal, which were constructed during the late 1800s and early 1900s. Prior to this time, Alameda consisted of a peninsula surrounded by marsh and tidal areas. After construction of the Inner Harbor and Tidal Canal, fill was laid over the marsh, tidal areas, and open waters, primarily at the north and western end of the island. NAS Alameda is constructed on this fill material. The source of much of the fill material is undocumented although the use of dredge spoils from the nearby waterways is a likely source for much of the fill material.

1.1.1 Building 360 Industrial Wastewater Treatment Plant Description

Building 360 occupies approximately 4.5 acres of land. The building contained specialized production shops for the repair and testing of aircraft engines between 1954 and 1996. The building contained a paint shop, parts cleaning shop, and machine shops. Prior to 1975, plating wastes were discharged to the Seaplane Lagoon via the storm sewer system. After 1975, plating wastes were routed to an industrial wastewater treatment facility (IWTP) located adjacent to Building 414, west of Building 360.

1.1.2 Former Underground Storage Tank 615-4 at the Southeast Corner of Building 5

Building 5 occupies approximately 18.5 acres of land. Aircraft component repair and maintenance operations in Building 5 began in 1942 and includes aircraft overhang stripping and painting, cleaning, reworking, and manufacturing of metal parts, tool maintenance, plating, and paint operations. One primary area located in Building 5 and in the southeast corner outside Building 5 was used for storage of hazardous waste, these storage areas were closed in 1988. Waste in drums stored in these areas included spent solvent, waste paint, and waste oil.

The hazardous materials storage area located southeast of Building 5 was used for dispensing of light to heavy lubricating oils, hydraulic fluid, machine coolants, and chlorinated solvents from 55-gallon drums. The area was 52 feet long by 45 feet wide and provided storage for 23 drums.

Oil was removed through an oil/water separator (UST 615-3) and the wastewater was discharged to the industrial sewer. The removed oil was collected in UST 615-4. UST 615-4 was an 80-gallon tank that was removed in 1998.

1.2 Scope of Work

The field activities to be performed include pre-excavation soil samples and soil excavation and disposal at the Building 360 IWTP; and soil excavation and disposal and soil confirmation sampling at the former UST 615-4. Activities described include the following:

- Site mobilization
- Boring location staking
- Utility clearance
- Concrete core sampling
- Concrete and asphalt demolition and removal
- Installation of sheet piling
- Direct-push sampling
- Soil excavation and disposal
- Boring abandonment
- Repaving of concrete and asphalt
- Equipment decontamination
- Waste water management

An activity hazard analysis for each of the above activities has been developed and is located in Section 3.1 of this plan.

2.0 Responsibilities

Each person is responsible for their own health and safety; for completing tasks in a safe manner; and for reporting any unsafe acts or conditions to their supervisor and the Project Superintendent (PS). All persons on site are responsible for continuous adherence to health and safety procedures during the performance of any project work. In no case may work be performed in a manner which conflicts with the intent of, or the inherent safety precautions expressed in, this SHSP. After due warning, persons who violate procedures or work rules may be dismissed from the site, terminated, or have their contract revoked. Blatant disregard or repeated infractions of health and safety policies are grounds for disciplinary action up to, and including, dismissal and/or removal from the project.

All IT Corporation (IT) and subcontractor personnel are required to read and acknowledge their understanding of this SHSP. All project personnel are expected to abide by the requirements of this SHSP and to cooperate with project management and safety representatives to ensure a safe and healthful work site. Site personnel are required to immediately report any of the following to the PS:

- Accidents and injuries, no matter how minor
- Expected or uncontrolled release of chemical substances
- Any sign or symptoms of chemical exposure
- Any unsafe or malfunctioning equipment
- Any changes in site conditions which may affect the health and safety of project personnel

Key project personnel are identified in Attachment 2, "Emergency Phone Numbers," of this SHSP.

3.0 Project Hazard Analysis

3.1 Activity Hazard Analysis

Activity Hazard Analyses are identified in Attachment 3.

3.2 Chemical Contaminants of Concern

3.2.1 Known Concentrations in Soil and Water at Building 360 IWTP

Chemical	Concentration (mg/kg) Soil	Concentration (ppm) Water
Benzene	.0017	N/A
Toluene	.0680	N/A
TCE	.0095	N/A
Arsenic	6.0	N/A
Beryllium	0.65	N/A
Cadmium	10	N/A
Total Chromium	260	N/A

3.2.2 Known Concentrations in Soil and Water at Former UST 615-4

Chemical	Concentration (mg/kg) Soil	Concentration (ppm) Water
Gasoline	6,100	N/A
Diesel	5,500	N/A
Motor Oil	2,000	N/A
PAHs (benzo(a)anthracene)	28.00	N/A

3.2.3 Hazardous and Toxic Materials

Contaminant (Synonyms)	Physical Description	Chemical & Physical Properties	Incompatibilities	Target Organs	Symptoms of Exposure
Benzene	Colorless liquid with aromatic odor	MW: 78 BP: 176°F MP: 42°F VP: 75 mm Hg Sol: 0.18% FP: 12°F LEL: 1.3% UEL: 7.1% IP: 9.25 eV	Chlorine, bromine with iron; strong oxidizers	Blood, bone marrow, eyes, skin, respiratory system, CNS	Eye, nose, and respiratory system irritation; headache, nausea, dizziness; fatigue, anorexia; dermatitis; abdominal pain, bone marrow depression
Toluene (Methyl benzene)	Colorless liquid with an aromatic odor like benzene	MW: 92 BP: 231°F MP: -139°F VP: 22 mm Hg Sol: 0.05% FP: 40°F LEL: 1.3% UEL: 7.1% IP: 8.82 eV	Strong oxidizers	Skin, liver, kidneys, CNS	Dermatitis; weakness, fatigue, dizziness; euphoria; dilated pupils, photophobia
Trichloroethylene (Trichloroethene, TCE)	Colorless liquid with a sweet chloroform-like odor	MW: 131 BP: 188°F MP: -123°F VP: 50 mm Hg Sol: 0.1% FP: None LEL: 11% UEL: 41% IP: 9.47 eV	Strong caustics; when acidic, reacts with aluminum; chemically active metals (barium, lithium, sodium, magnesium, titanium)	Skin, respiratory system, heart, liver, kidneys, skin, CNS	Eye irritation; dermatitis, headache, vertigo, blurred vision; nausea, vomiting, tremors; loss of feeling in extremities
Arsenic	Variable	MW: Varies BP: Sublimes MP: Sublimes VP: 0 mm Hg Sol: Insoluble FP: N/A LEL: N/A UEL: N/A IP: N/A	Strong oxidizing agents	Liver, kidneys, skin, lungs, lymphatic system	Dermatitis; ulceration of nasal system; respiratory system irritant; gastrointestinal disturbances; darkening of skin; peripheral nerve damage
Benzo(a)pyrene (PAHs)	Yellow crystals	MW: N/A BP: 310°C MP: 179°C VP: N/A Sol: Insoluble FP: N/A LEL: N/A UEL: N/A IP: N/A	Strong oxidizers	Respiratory system, skin bladder, kidneys, (lung, kidney, and skin cancer)	Dermatitis, bronchitis; lung, kidney, and skin cancer

Contaminant (Synonyms)	Physical Description	Chemical & Physical Properties	Incompatibilities	Target Organs	Symptoms of Exposure
Diesel fuel	Brown, slightly viscous liquid	MW: Varies BP: 340 to 675°F MP: Varies VP: Varies Sol: Insoluble FP: 125°F LEL: 0.6% UEL: 7.5% IP: Varies	Strong oxidizers	CNS, skin and mucous membrane	Headache, nausea, CNS, depression, anorexia, pulmonary edema, kidney and liver damage
Beryllium	Hard, brittle, gray metal	MW: 9.01 BP: 2500°C MP: 1287°C VP: 0 mm Hg Sol: Complete FP: N/A LEL: N/A UEL: N/A IP: N/A	Sodium metal, aluminum, halogenated hydrocarbons	Lungs, skin, eyes, mucous membranes	Eye, skin, nose, and throat irritation, cough, difficulty breathing
Cadmium dust	Metal: silver- white, blue- tinged lustrous, odorless solid	MW: 112.4 BP: 1409°F MP: 610°F VP: 0 mm Hg Sol: Insoluble FP: N/A LEL: N/A UEL: N/A IP: N/A	Strong oxidizers, elemental sulfur, selenium and tellurium	Respiratory system, kidneys, prostate, blood	Pulmonary edema, dyspnea, cough, chest tightness, substernal pain, headache, chills, muscle aches, nausea, vomiting, diarrhea, anosmia, emphysema, proteinuria, mild anemia, carcinogen
Chromium	Metal, steel gray to blue white, hard, odorless solid	MW: 52 BP: 4788°F MP: 3452°F VP: 20 mm Hg Sol: Insoluble FP: N/A LEL: N/A UEL: N/A IP: N/A	Strong oxidizers, alkalis	Eyes, skin, respiratory system	Eyes, skin and respiratory system irritation
Gasoline	Clear liquid, may be yellow to red in color, with strong kerosene- like odor	MW: Variable BP: 74 to 430°F MP: N/A VP: 400 mm Hg Sol: Insoluble FP: -40°F LEL: 1.1% UEL: 7.6% IP: Not established	Strong oxidizers	Skin, eyes, respiratory system, CNS	Eye, skin, and respiratory system irritation; headache, nausea, dizziness, coma, death; pulmonary edema, bronchitis

Hazardous and Toxic Materials Notes:

MW denotes molecular weight

BP denotes boiling point (°F)

MP denotes melting point (°F)

VP denotes vapor pressure (mm Hg)

Sol denotes solubility in water (relative)

FP denotes flash point (°F)

LEL denotes lower explosive limit (%)

UEL denotes upper explosive limit (%)

IP denotes ionization potential (electron volts: eV)

3.2.4 Exposure Guidelines for Identified Health-Significant Site Contaminants

Contaminant (Synonyms)	OSHA PEL		ACGIH TLV		NIOSH REL		IDLH
	8-HR TWA	15-MIN STEL	8-HR TWA	15-MIN STEL	8-HR TWA	15-MIN STEL	
Benzene	1 ppm	5 ppm	10 ppm	—	0.1 ppm	1 ppm	Carcinogen: confirmed Teratogen: suspect 500 mg/m ³
Toluene	100 ppm	150 ppm	50 ppm	—	100 ppm	150 ppm	2,000 ppm
TCE	25 ppm	200 ppm	50 ppm	100 ppm	25 ppm	2 ppm	1,000 ppm Carcinogen: suspect
Arsenic	0.01 mg/m ³	—	0.01 mg/m ³	—	—	0.002 mg/m ³	5 mg/m ³ Carcinogen: confirmed
Beryllium	0.002 mg/m ³	0.005 mg/m ³ ceiling	A-2 0.002 mg/m ³	—	—	0.005 mg/m ³	4 mg/m ³ Carcinogen: suspect
Cadmium dust	0.005 mg/m ³	—	0.01 mg/m ³ — elemental 0.002 mg/m ³ — compounds	—	Lowest feasible concentration	—	9 mg/m ³ Carcinogen: suspect
Chromium	0.5 mg/m ³	—	0.5 ppm	—	.5 ppm	—	250mg/ m ³ (as Cr)
PAHs (benzo(a)pyrene)	0.2 mg/m ³	—	A-2	—	0.1 mg/m ³	—	Carcinogen: suspect Mutagen: suspect
Diesel engine exhaust	—	—	—	—	Lowest feasible concentration	—	Carcinogen
Gasoline engine exhaust	—	—	—	—	—	—	Carcinogen

ppm denotes part(s) per million

mg/m³ denotes milligrams per cubic meter

3.2.5 Proposition 65 Warning and Notification and Material Safety Data Sheets

The State of California's Safe Drinking Water and Toxic Enforcement Act of 1986

(Proposition 65) requires notification of all persons who may be exposed to substances that have been determined by the State of California to cause cancer, birth defects, or other reproductive

harm. The contaminants that may be present on site that have been determined by the State to cause cancer or reproductive harm are listed in Attachment 4 of this SHSP, "Proposition 65 Notice and Material Safety Data Sheets."

Material Safety Data Sheets (MSDSs) are provided in Attachment 4 for all materials that may be used during the course of project operations.

4.0 Buddy System

Project staffing during hazardous waste operations shall meet the requirements and intent of the “buddy system,” which states that at least two persons are required to be at the work area or exclusion zone (EZ), when there may be risk of worker contamination or serious injury.

Respiratory protection, when worn, will always require that the buddy system be observed (for air-purifying respirators as well as supplied-air respirators).

5.0 Personal Protective Equipment

5.1 Activity-Specific Levels of Protection

The required level of protection is specific to the activity being conducted. The initial levels of personal protective equipment (PPE) are as follows:

5.1.1 Building 360 IWTP and Former UST 615-4

Task	Activity	Initial Levels of PPE
Mobilization/demobilization	All	Level D
Utility clearance	All	Level D
Concrete core sampling	All	Modified Level D
Sheet pile installation	All	Modified Level D
Concrete/asphalt demolition	All	Level D
Direct-push sampling	Site set up	Level D
	Sampling	Modified Level D
	Decontamination	Modified Level D
Soil excavation and removal	Soil excavation	Modified Level D
	Dewatering	Modified Level D
	Soil drying	Level D
	Decontamination	Modified Level D
Boring abandonment	All	Level D
Equipment decontamination	All	Modified Level D

As site activities progress, levels of PPE are subject to change or to modification. Upgrading of PPE can occur when action levels are exceeded or whenever the need arises to protect the safety and health of site personnel. Levels of PPE will not be downgraded without prior approval from the Program Certified Industrial Hygienist (CIH).

No work will be permitted in Level B without the authorization and concurrence of the Program CIH. No work will be permitted in Level A without the authorization and concurrence of the Program CIH and the Vice-President of Health and Safety.

PPE level upgrades or downgrades are customarily verbal communication between the Program CIH and the Site Health and Safety Officer and are based on the results of air sampling data.

6.0 Site Control

6.1 Site Control

This project requires that access to the site be controlled to protect both the worker and the public. This access control may require fences, barricades, traffic control devices, use of flaggers, caution tape, and other means to keep the site secure and to provide a visual barrier to help keep the curious or unaware public from entering the site. For sites where work includes hazardous waste operations, the work area will be divided into three work zones based on the exposure to contaminated materials or anticipated hazards associated with the work: an exclusion zone (EZ), a contamination reduction zone (CRZ), and a support zone (SZ).

6.2 Hazard Briefing

No person will be allowed on the site during site operations without first being given a site hazard briefing. In general, the briefing will consist of a review of this SHSP and the tailgate safety meeting. All persons on the site, including visitors, must sign the SHSP Acknowledgement Sheet (page vi of this SHSP) and the tailgate safety meeting form. The tailgate safety meetings shall be held daily prior to site activities.

6.3 Entry Log

A site entry/exit log will be maintained with names of all personnel who enter the CRZ or the EZ.

7.0 Decontamination

7.1 Personnel Hygiene and Decontamination Facilities and Procedures

Requirements for personnel hygiene and decontamination for this project are detailed in the Program Health and Safety Plan.

7.2 Equipment Decontamination Facilities and Procedures

Specific requirements for equipment decontamination facilities for this project are detailed in the Program Health and Safety Plan.

8.0 Site Monitoring

8.1 Air Monitoring

Personnel and ambient air monitoring is essential to ensure that all field personnel are adequately protected from airborne contaminants. The action levels specified in this section have been established based on contaminants of concern, the potential route of entry, duration of exposure, and the permissible exposure levels established by Occupational Safety and Health Administration (OSHA) as well as guidelines published by the American Conference of Governmental Industrial Hygiene (ACGIH) and National Institute for Occupational Safety and Health (NIOSH). These action levels will vary from project to project.

8.1.1 Action Levels

Analyte	Action Level ^a	Required Action ^b
LEVEL D PPE		
Dust	> .5 mg/m ³ above background	Upgrade to Level C
Unknown VOCs	> 5 ppm above background	Detector tube for benzene; continue work if no benzene is detected
Benzene	> 1 ppm or ≤ 5 ppm	Upgrade to Level C
	> 5 ppm	Stop work; contact CIH ^c
O ₂	≥ 23.5% or ≤ 20%	Stop work; contact CIH ^c
LEL	10% of LEL	Stop work; determine cause ^c
LEVEL C PPE		
Dust	> 5.0 mg/m ³ above background	Stop work; initiate dust suppression
Unknown VOCs	> 50 ppm above background in breathing zone	Use a detector tube for benzene; continue work if no benzene is detected
Benzene	> 5 but ≤ 50 ppm	Upgrade to Level B, contact CIH ^c
O ₂	≥ 23.5% or ≤ 20%	Stop work; contact CIH ^c
LEL	10% of LEL	Stop work; determine cause ^c
LEVEL B PPE		
Unknown VOCs	100 ppm above background in BZ	Stop work; detector tube for benzene; contact CIH ^c
O ₂	≥ 23.5% or ≤ 20%	Stop work; contact CIH ^c
LEL	10% of LEL	Stop work; determine cause ^c

^a Five excursions above the action level in any 15-minute period or a sustained reading in excess of the action levels for 5 minutes will trigger a response.

^b Frequency of air monitoring may be adjusted by the CIH after sufficient characterization of site contaminants has been completed, tasks have been modified, or site controls have proven effective.

^c Contact with the Program CIH must be made prior to continuance of work. The Program CIH may then initiate integrated air sampling along with additional engineering controls.

No one is permitted to downgrade levels of PPE without authorization from the Program CIH.

8.1.2 Real-Time Air Monitoring Frequency and Location

Work Activity	Instrument	Frequency ^a	Location
Activity 1 Mobilization/demobilization	PID	N/A	N/A
	Miniram	N/A	N/A
	O ₂ /LEL	N/A	N/A
	Detector Tube (Benzene)	N/A	N/A
Activity 2 Utility clearance	PID	N/A	N/A
	Miniram	N/A	N/A
	O ₂ /LEL	N/A	N/A
	Detector Tube (Benzene)	N/A	N/A
Activity 3 Concrete core sampling	PID	Periodically	BZ of employee
	Miniram	Continuously	BZ of employee
	O ₂ /LEL	N/A	N/A
	Detector Tube (Benzene)	Periodically	BZ of employee
Activity 4 Sheet pile installation	PID	Periodically	BZ of employee/area
	Miniram	Continuously	BZ of employee/area
	O ₂ /LEL	Periodically	Area
	Detector Tube (Benzene)	Periodically	BZ of employee/area
Activity 5 Direct-push sampling	PID	Periodically	BZ of employee/area
	Miniram	N/A	N/A
	O ₂ /LEL	Periodically	BZ of employee/area
	Detector Tube (Benzene)	Periodically	BZ of employee
Activity 6 Decontamination	PID	N/A	N/A
	Miniram	N/A	N/A
	O ₂ /LEL	N/A	N/A
	Detector Tube (Benzene)	Periodically	BZ of employee
Activity 7 Soil excavation	PID	Periodically	BZ of employee/area
	Miniram	Continuously	Area
	O ₂ /LEL	Periodically	BZ of employee/area
	Detector Tube (Benzene)	Periodically	BZ of employee
Activity 8 Dewatering	PID	Periodically	BZ of employee/area
	Miniram	N/A	N/A
	O ₂ /LEL	Periodically	BZ of employee/area
	Detector Tube (Benzene)	Periodically	BZ of employee
Activity 9 Soil drying	PID	Periodically	BZ of employee/area
	Miniram	Continuously	Area/BZ of employee
	O ₂ /LEL	N/A	N/A
	Detector Tube (Benzene)	Periodically	BZ of employee

^a Frequency of air monitoring may be adjusted by the CIH after sufficient characterization of site conditions has been completed.
 "Periodically" is defined as at least once an hour unless sampling data demonstrates a less frequent monitoring schedule is justified.

8.1.3 *Integrated Personal Exposure Monitoring*

At this time no integrated personal exposure monitoring will be conducted. Should site conditions change or real-time air monitoring results warrant, the Program CIH shall be contacted.

8.2 *Monitoring of Physical Hazards*

The monitoring of physical hazards such as noise, temperature, wind speed, and dust may be performed by the Site Health and Safety Specialist (SHSS) under the direction of the Program CIH. The specific requirements for noise monitoring and evaluating heat and cold stress are discussed in detail in the PHSP as well as in the IT Health and Safety Policies and Procedures Manual.

9.0 Employee Training

9.1 Tailgate Safety Meetings

Prior to the start of the project, all personnel will participate in an initial tailgate safety meeting. During the initial tailgate safety meeting, this SHSP will be discussed. The PS will ensure that the anticipated site hazards are summarized and explained to all personnel, and that those personnel are aware of the precautions they must take to minimize their exposure to the hazards. Tailgate safety meetings will be held at the start of each work shift. All new employees must attend a Site Health and Safety orientation. Attendance records and meeting notes shall be maintained with the project file.

9.2 Hazardous Waste Training

All personnel entering the EZ or CRZ shall have completed at least 40 hours of hazardous waste operations-related training (as required by 29 CFR 1910.120, or in California T8CCR-5192) and may also be required to complete the following job-specific training:

- 40 hours of training for all personnel
- 3 days of field experience
- Current 8-hour refresher (within the last 12 months)
- 8-hour supervisory training (supervisors)
- Trenching/Excavation competent person training
- Entry supervisor training for confined spaces
- Confined space entry training for workers

9.3 Hazard Communication

All personnel performing field activities will receive basic hazard communication training. This training involves a review of the IT written hazard communication program (IT Health and Safety Procedure HS060), MSDSs for chemicals used on site, container labeling, and chemical health hazards. MSDSs will be obtained for all materials purchased or brought on site that require an MSDS and the MSDS will be kept on site with this SHSP.

9.4 Site-Specific Training

Site-specific training will be accomplished through an initial review of this SHSP by the SHSS and through the daily tailgate safety meetings. Attendance for such training shall be tracked by obtaining signatures of all attendees and shall be documented in the project files.

9.5 *First Aid and Cardiopulmonary Resuscitation*

At least two employees current and certified in first aid and cardiopulmonary resuscitation (CPR) will be assigned to the project, and at least one of these will be on the site whenever operations are ongoing. Where multiple work groups are dispersed throughout a project site, more than two employees will be current and certified in first aid and CPR. The extent of coverage will be determined relative to the number of employee groups. First aid-trained personnel shall also be trained in bloodborne pathogen hazards. IT requires refresher training in first aid and CPR for such individuals to maintain a current certificate. The SHSS shall be current and certified in first aid and CPR training.

10.0 Medical Surveillance Program

IT uses the services of Health Resources for medical surveillance requirements for all projects. All personnel on site working within the CRZ or EZ will have completed an occupational medical monitoring physical within the last 12 months. Such individuals shall also have written clearance in their record to work on hazardous waste sites and to wear a respirator if required by the job.

11.0 Emergency Response Plan and Contingency Procedures

Site personnel must be prepared to respond and act quickly in the event of an emergency. Emergency preparedness and response procedures will aid in protecting site workers and the surrounding environment. Preplanning measures will include employee training; fire and explosion prevention and protection; chemical spill and discharge prevention and protection; and safe work practices to avoid personal injury or exposure. These items will be discussed in the daily tailgate safety meetings.

11.1 Project Superintendent

At all times during scheduled work activities, a designated PS will be present on the site. This individual is responsible for implementing any emergency response or contingency procedures. Depending upon the circumstances, and time permitting, the PS will review proposed response actions with the SHSS.

11.2 Site Health and Safety Specialist

The SHSS is responsible for implementing, communicating, and enforcing health and safety policies and procedures during the course of the project. The SHSS will also assist in the evaluation of health and safety concerns with respect to environmental releases and emergency response actions. In the event of an injury, contact the Concord Health and Safety Administrator for notification of the medical incident and reporting of it to the Health Resources case manager.

11.3 List of Emergency Contacts and Notification

The PS and SHSS will be notified immediately in the event of an emergency. The PS will immediately evaluate the incident and, if necessary, notify the Alameda Fire Department. Telephone numbers for emergency contact personnel are listed in Attachment 2.

11.4 Fire Control

In the event of a fire or explosion, or imminent danger of fire or explosion, all activities will halt, and the Alameda Fire Department will be notified immediately. If it is safe to do so, site personnel may use fire-fighting equipment available on site to remove and isolate flammable or other hazardous materials, which may contribute to the fire.

The following measures will be implemented during site activities to minimize the risk of fire and/or explosion:

- Smoking will be prohibited on site except in designated smoking areas

The following measures will be implemented during site activities to minimize the risk of fire and/or explosion:

- Smoking will be prohibited on site except in designated smoking areas
- Good housekeeping procedures will be required on site
- Material storage methods will comply with manufacturers' recommendations
- Flammable liquids will be stored in approved containers only
- All storage, handling, or use of flammable and combustible materials will be conducted by trained personnel only
- Entry and exit pathways will be kept clear of debris or obstacles
- Work areas will be cleared of excess vegetation and obstructions
- Hot Work Permits will be required on site

11.5 Site Evacuation Procedures

The authority to order personnel to evacuate the work area rests with the PS and the SHSS. In the event that site evacuation is required, a continuous, uninterrupted air horn or vehicle horn will be sounded for approximately ten seconds. Personnel working on the site will immediately make their way to the muster point for a "head count."

The EZ location, evacuation routes, and emergency equipment locations will be included on a map prior to the initiation of on-site activities. This map will be developed by the SHSS at the site location and posted at each entrance to the EZ. An example of an EZ evacuation map has been developed for a typical EZ and has been included in Attachment 6 along with an EZ evacuation template. During an emergency, the evacuation routes noted on the site map should be followed. If conditions such as wind direction or physical hazards do not allow access to the prescribed evacuation routes, evacuate by the safest route available.

11.6 Spills or Leaks

IT will maintain the following equipment and materials in the CRZ for use during spill response activities:

- Absorbent pads
- Granular absorbent material
- Polyethylene sheeting
- 55-gallon drums
- Shovels and assorted hand tools

11.7 Medical Emergency Response

In the event of severe physical or chemical injury, Alameda Fire Department personnel shall be summoned for emergency medical treatment and ambulance service. The Alameda Fire Department emergency medical responders will be utilized to provide care to severely injured personnel. Once an initial assessment is made by the emergency medical technicians, the decision to use ground or air transportation for the victims will be made. Minor injuries will be treated on site by qualified first aid and CPR providers and if additional treatment beyond first aid is required, the injured personnel will be transported to the designated hospital.

Transportation routes and maps shall be placed in each site vehicle prior to the initiation of on-site activities. Maps from the sites to applicable hospitals are included in Attachment 1.

11.8 Personal Exposure or Injury

In the event of personal exposure to contaminants, the following general guidelines will be adhered to:

- Contact/Absorption
 - Flush contaminants from the victim's skin using copious amounts of distilled or tap water, for at least 20 minutes.
 - Start flushing skin while removing contaminated clothing.
 - If irritation persists, repeat flushing.
 - Assess condition of the victim and arrange for transport to a medical center, if necessary.
 - Do not transport victim unless the recommended flushing period is completed or flushing can be continued during transport.
- Inhalation
 - Move the victim **IMMEDIATELY** to an area where fresh air is available.
 - Decontaminate the victim, if necessary.
 - Administer artificial respiration, if necessary.
 - Assess condition of the victim and arrange for transport to a medical center, if necessary.
- Ingestion
 - Contact the local poison control center **IMMEDIATELY**.
 - Decontaminate the victim, if necessary.
 - Transport the victim to a medical facility, if necessary.

11.9 List of Emergency Contacts and Notifications

The SSHS will immediately evaluate the incident and, if necessary, notify emergency support services. If not previously notified, the PM and location contact will be advised of the situation.

Telephone numbers for emergency personnel are listed in Attachment 2. This list will be maintained with current contacts, and telephone lists will be kept along with other emergency phone numbers in each site vehicle.

The information provided to the notified person should include the nature of the incident and the exact location and suspended materials involved. Information regarding the incident that should be reported to the emergency operator includes the following:

- Name and telephone number of the individual reporting the incident
- Location and type of incident
- Nature of the incident (fire, explosion, spill, or release) and substances involved
- Number and nature of medical injuries
- Movement or direction of spill/vapor/smoke
- Response actions currently in progress
- Estimate of quantity of any released materials
- Status of incident
- Other pertinent information

ATTACHMENT 1
SITE MAP AND ROUTE TO NEAREST HOSPITAL

DRAWING NUMBER 772920-A6

CHECKED BY

APPROVED BY

S.J.Z.

1-12-98

DRAWN BY

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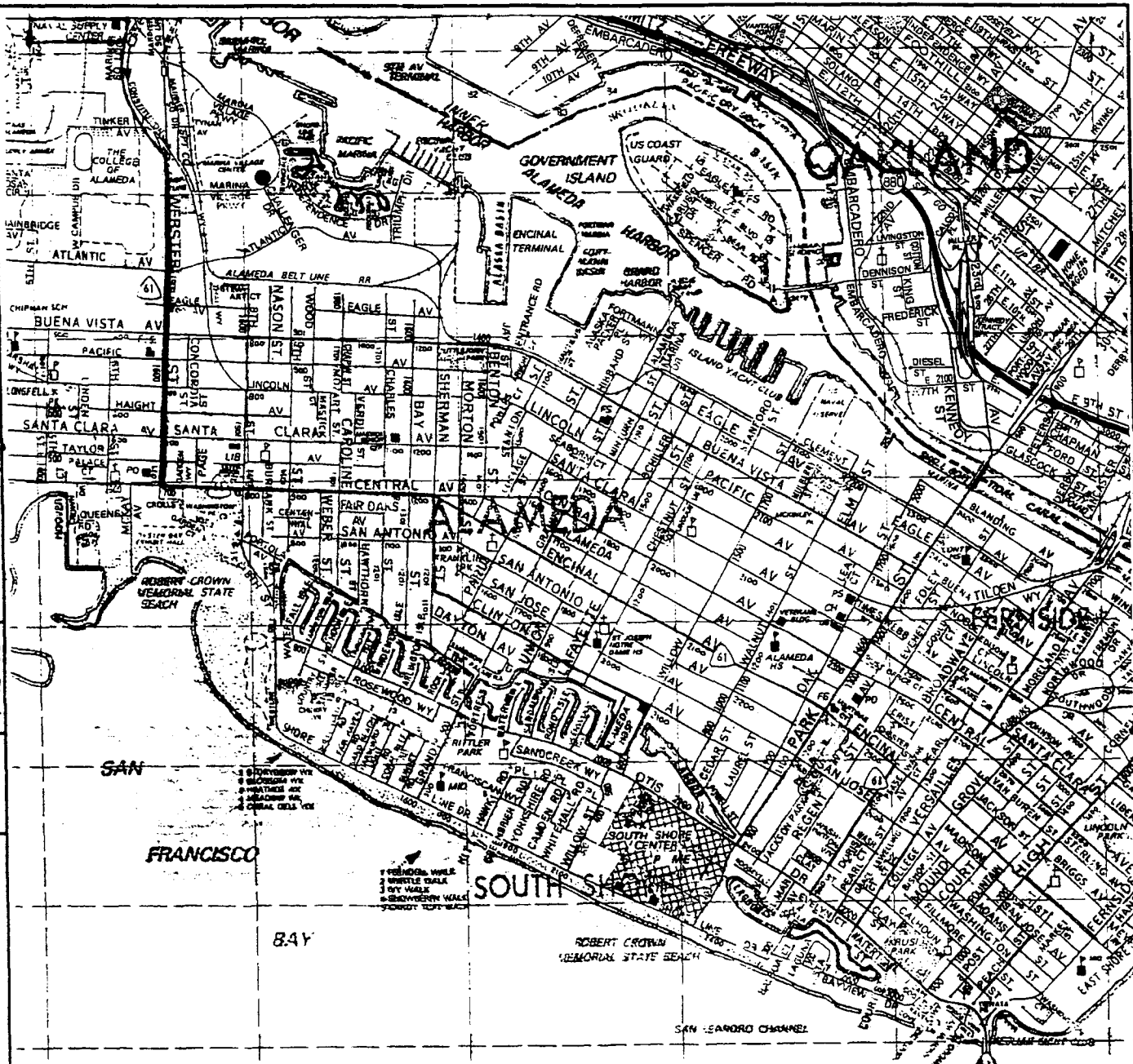
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DIRECTIONS TO ALAMEDA HOSPITAL

FROM THE MAIN GATE,

TAKE MARINER SQUARE LOOP TO WEBSTER ST. (HWY 61) AND TURN RIGHT.

AFTER APPROXIMATELY 8 BLOCKS TURN LEFT (EAST) ON CENTRAL AVE..

CONTINUE ON CENTRAL AVE., TURN RIGHT ON SHERMAN ST. (SOUTH).

FROM SHERMAN ST., TURN LEFT ON CLINTON AVE.

CONTINUE TO WILLOW ST., TURN RIGHT TO HOSPITAL, CORNER OF CLINTON AND WILLOW.

FIGURE 12-1

HOSPITAL ROUTE

PREPARED FOR

FLEET AND INDUSTRIAL SUPPLY
CENTER; ALAMEDA ANNEX



INTERNATIONAL
TECHNOLOGY
CORPORATION

REFERENCE:

THOMAS BROS. MAPS

NOT TO SCALE

ATTACHMENT 2
EMERGENCY PHONE NUMBERS

Emergency Phone Numbers

Contact	Phone Number
Alameda Fire Department Emergency	911
Alameda Point Police/Security Department Emergency	911
Alameda Point HAZMAT Response Emergency	911
Hospital: Alameda Hospital Emergency Room Directions To Medical Care: Alameda Hospital, 2070 Clinton Ave. Exit Main Gate, take Mariner Square Loop to Webster St. (Hwy 61) and turn right. After approximately 8 blocks, turn left (East) on Central Ave.; turn right on Sherman St. (South) From Sherman St.; turn right to hospital, corner of Clinton and Willow.	(510) 523-4357
Key Project and IT Personnel	
IT Program Manager: Stewart Bornhoft	(925) 288-2081
Program CIH: Fred Mlakar	(949) 261-6441
Project Manager: Daniel Shafer	(916) 928-3300
Site Health & Safety Specialist: Londell Allen	Pager: (888) 795-2204
Site Health & Safety Specialist Alternate: Chuck Holman	(925) 288-2155 Pager: (925) 988-5595
Health & Safety Administrator: Carey Von Williams	(925) 288-2378 Pager: (888) 537-9657
Occupational Physician: Health Resources	(800) 350-4511
Medical Incident Reporting: Health Resources	(800) 350-4511
Navy Contact ROICC: Warren Yip	(510) 749-5939
Base Safety Officer: Cornell Brown	(510) 749-5967
Navy On-Scene Coordinator: Steve Edde	(510) 749-5952

ATTACHMENT 3
ACTIVITY HAZARD ANALYSIS

ACTIVITY HAZARD ANALYSIS
Backfilling and Compaction

Page 1 of 2

Activity	Potential Hazards	Recommended Controls
Backfilling	Heavy equipment operations	Before any machinery or mechanized equipment is placed into service, a competent mechanic must inspect, test and certify to be in safe operating condition.
	Areas on or adjacent to contaminated material	Implement appropriate level of protection.
		Implement dust control measures.
		Inspect equipment before placing into service and at the beginning of each shift.
		Follow preventive maintenance procedures recommended by the manufacturer.
		Use lockout-tagout procedures for equipment found to be faulty or undergoing maintenance.
		Ensure that only designated personnel operate machinery and mechanized equipment.
		Ensure that no personnel get off or on any equipment while it is in motion.
		Do not allow machinery or equipment requiring an operator to run unattended.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
		Shut down all machinery or equipment and take positive means to prevent its operation while repairs or manual lubrications are being completed.
		Make all repairs on machinery or equipment at a location that provides protection from traffic for repair persons.
		Fully lower or block bulldozer and scraper blades, end-loader buckets, and similar equipment when being repaired or when not in use.
		Ensure that all self-propelled construction equipment is equipped with a back-up alarm.
	Overhead power lines	Follow Program Health and Safety Plan guidelines.
	Fire	Ensure that each bulldozer, backhoe, or other similar equipment is equipped with at least one dry chemical fire extinguisher having a minimum UL rating of I A513C.
	Open excavations	Adhere to IT Policy and Procedure HS307 "Excavation and Trenching" at all times.
		Backfill excavations as soon as possible.
	Contact with moving equipment	Ensure that ground personnel wear reflective vests.
	Noise	The use of hearing protection is mandatory for noise levels above 85 dBA.

ACTIVITY HAZARD ANALYSIS
Backfilling and Compaction (Continued)

Page 2 of 2

Activity	Potential Hazards	Recommended Controls
Final grading	Contaminated borrow material	Check historical and analytical data on borrow material.
	Noise hazards	Use hearing protection (mandatory) for noise levels above 85 dBA.
	Use qualified operators	Ensure that all grounding is in place.
	Heavy equipment travel	Use qualified operators.
	Mechanical moving parts, pinch, paint, etc.	Ensure that all grounding is in place.
Nuclear density gauge	Radiation	Ensure that all emergency stop switches are working.
		Ensure that trained and qualified operators operate equipment.
		Ensure that equipment operators are aware of gauge location.
Equipment to be Used	Inspection Requirements	Training Requirements
<ul style="list-style-type: none"> • Hand tools • PPE • Heavy equipment 	<ul style="list-style-type: none"> • Pre-/postmaintenance • Visual prior to use • CESP Form 150 R 	<ul style="list-style-type: none"> • Tailgate safety meeting • Site-specific orientation • Hazardous waste operations • Hazard communication

ACTIVITY HAZARD ANALYSIS
Excavation and Hauling of Contaminated Materials/Soil

Page 1 of 3

Activity	Potential Hazards	Recommended Controls
Excavation	Underground utilities	All underground utilities will be located prior to excavating.
	Open excavations	IT Policy and Procedure HS307 - "Excavation and Trenching" will be adhered to at all times.
	Confined spaces	IT Policy and Procedure HS 300 - "Confined Spaces" will be adhered to at all times.
	Noise	Noise levels above 85 dBA mandates hearing protection.
	Heavy equipment operations	<p>Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.</p> <p>Equipment shall be inspected before being placed into service and at the beginning of each shift.</p> <p>Preventive maintenance procedures recommended by the manufacturer shall be followed.</p> <p>A lockout - tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.</p> <p>Machinery and mechanized equipment shall be operated only by designated personnel.</p> <p>Getting off or on any equipment while it is in motion is prohibited.</p> <p>Machinery or equipment requiring an operator shall not be permitted to run unattended.</p>
	Contact with overhead power lines	See distances in Program Health and Safety Plan.
	Heavy equipment operations	<p>Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.</p> <p>All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.</p> <p>All repairs on machinery or equipment will be made at a location which provides protection from traffic for repair persons.</p> <p>Bulldozer and scraper blades, end-loader buckets, and similar equipment will be either fully lowered or blocked when being repaired or when not in use.</p> <p>All self-propelled construction equipment shall be equipped with a back-up alarm.</p>
	Fire	Each bulldozer, backhoe, or other similar equipment will be equipped with at least one dry chemical fire extinguisher having a minimum UL rating of 1A5BC.

ACTIVITY HAZARD ANALYSIS

Page 2 of 3

Excavation and Hauling of Contaminated Materials/Soil (*Continued*)

Activity	Potential Hazards	Recommended Controls
Excavation (<i>Continued</i>)	Contact with potentially contaminated materials, pathogens, or disease vectors	<p>Perform dust control measures.</p> <p>Real-time air monitoring will take place. Proper personal protective clothing and equipment will be utilized.</p> <p>Good housekeeping will be stressed to safe guard against cross contamination of surrounding areas and eliminate safety hazards.</p> <p>All site personnel will practice good personal hygiene.</p> <p>The work area will be demarcated. All unnecessary personnel will be kept out of the work area and in an upwind location.</p> <p>Refer to SHSP for chemical and environmental hazards.</p>
	Potential lead involvement or exposure (hazard); arsenic and cadmium	<p>Perform dust control measures.</p> <p>Personal air samples will be collected to determine an exposure assessment.</p> <p>Engineering controls will be implemented.</p> <p>Proper personal protective clothing and equipment will be utilized.</p> <p>Personal hygiene and good housekeeping practices will be followed.</p> <p>Work zones will be established and clearly marked.</p> <p>Lead related training will be required.</p> <p>Refer to the SHSP or LMP for chemical hazard discussion.</p>
	Noise	Noise levels above 85 dBA mandates hearing protection.
	Slip, trip, and fall hazards	<p>Practice good housekeeping, keep work area picked up and as clean as feasible.</p> <p>Continually inspect the work area for slip, trip, and fall hazards.</p>
	Pinch points	<p>Keep feet and hands clear of moving/suspended materials and equipment.</p> <p>Beware of contact points.</p> <p>Stay alert at all times!</p>
	Strains and sprains	Use proper lifting techniques, lifts greater than 60 lbs require assistance or mechanical equipment; size up the lift.

ACTIVITY HAZARD ANALYSIS

Page 3 of 3

Excavation and Hauling of Contaminated Materials/Soil (Continued)

Activity	Potential Hazards	Recommended Controls
Material hauling	Scraper operations <ul style="list-style-type: none">• Scrapers will follow pre-determined route• Follow speed limits per plan• Adhere to same controls as for heavy equipment	Scrapers will have back-up alarms.
Equipment to be Used	Inspection Requirements	Training Requirements
<ul style="list-style-type: none">• Hand tools• PPE• Heavy equipment• Dump trucks	<ul style="list-style-type: none">• Pre-postmaintenance• Visual prior to use• CESP Form 150 R	<ul style="list-style-type: none">• Tailgate Safety Meeting• Site specific orientation• Hazardous waste operations• Hazard communication: lead, arsenic, cadmium

ACTIVITY HAZARD ANALYSIS
Backfilling and Compaction

Page 1 of 2

Activity	Potential Hazards	Recommended Controls
Backfilling	Heavy equipment operations	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.
	Areas on or adjacent to contaminated material	Implement appropriate level of protection.
		Implement dust control measures.
		Equipment shall be inspected before being placed into service and at the beginning of each shift.
		Preventive maintenance procedures recommended by the manufacturer shall be followed.
		All lockout-tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.
		Machinery and mechanized equipment shall be operated only by designated personnel.
		Getting off or on any equipment while it is in motion is prohibited.
		Machinery or equipment requiring an operator shall not be permitted to run unattended.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
		All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.
		All repairs on machinery or equipment will be made at a location that provides protection from traffic for repair persons.
		Bulldozer and scraper blades, end-loader buckets, and similar equipment will be either fully lowered or blocked when being repaired or when not in use.
		All self-propelled construction equipment shall be equipped with a back-up alarm.
	Overhead power lines	See Program Health and Safety Plan.
	Fire	Each bulldozer, backhoe, or other similar equipment shall be equipped with at least one dry chemical fire extinguisher having a minimum UL rating of I A513C.
	Open excavations	IT Policy and Procedure HS307 "Excavation and Trenching" will be adhered to at all times.
		Excavations will be backfilled as soon as possible.
	Contact with moving equipment	Ground personnel shall wear reflective vests.
	Noise	Noise levels above 85 dBA mandates the use of hearing protection.

ACTIVITY HAZARD ANALYSIS
Backfilling and Compaction (Continued)

Page 2 of 2

Activity	Potential Hazards	Recommended Controls
Final Grading	Contaminated borrow material	Check historical and analytical data on borrow material.
	Noise hazards	Administer hearing protection
	Use qualified operators	Have all grounding in place.
	Heavy equipment travel	Use qualified operators.
	Mechanical moving parts, pinch, paint, etc.	Have all grounding in place.
Nuclear density gauge	Radiation	Ensure that all emergency stop switches are working.
		Only trained and qualified operators shall operate equipment.
		Equipment operators shall be aware of gauge location.
Equipment to be Used	Inspection Requirements	Training Requirements
<ul style="list-style-type: none"> • Hand tools • PPE • Heavy equipment 	<ul style="list-style-type: none"> • Pre-/post-maintenance • Visual prior to use • CESP Form 150 R 	<ul style="list-style-type: none"> • Tailgate safety meeting • Site-specific orientation • Hazardous waste operations • Hazard communication

ACTIVITY HAZARD ANALYSIS

Page 1 of 5

Geoprobe

Activity	Potential Hazards	Recommended Controls
Rig Inspection	Faulty or damaged equipment being utilized to perform work	All machinery or mechanized equipment will be inspected by a competent mechanic and be certified to be in safe operating condition. Equipment will be inspected before being put to use and at the beginning of each shift. Faulty/unsafe equipment will be tagged and if possible locked out.
	Hydropunch	Equipment will be equipped with easily-accessible emergency shutdown devices.
	Uneven terrain, poor ground support, inadequate clearances, contact with utilities	Earth penetration equipment will not be transported with the mast up. The exceptions are: movement over level, smooth terrain; the path of travel has been inspected for stability and the absence of holes, other ground hazards, and electrical hazards; and the travel distance is limited to short, safe distances. The equipment operator will ascertain proper clearance prior to moving equipment. Clearance will be monitored by a spotter or by the use of an electrical proximity warning device
		Machinery and mechanized equipment will be operated only by designated personnel.
		Above and below ground utilities will be located prior to staging equipment.
		Whenever the equipment is parked, the parking brake will be set. Equipment parked on inclines will have the wheels chocked.
		Inspect rakes and tire pressure on rig.
	Overhead power lines	Distances see Program Health and Safety Plan.
	General	IT H&S Procedure HS316 will be adhered to.
Rig Operation	Inexperienced operator	Machinery and mechanized equipment will be operated only by designated personnel.
	Inexperienced operator	The operator will verbally alert employees and visually ensure employees are clear from dangerous parts of equipment prior to starting or engaging equipment.
	Falling objects	Hard hats, remove unsecured tools and materials before raising or lowering the derrick.
		Stay alert and clear of materials suspended overhead.
	Pinch points	Keep feet and hands clear of moving/suspended materials and equipment.
		Inspect for all pinch points.
		Stay alert at all times!!!

ACTIVITY HAZARD ANALYSIS
Geoprobe (Continued)

Activity	Potential Hazards	Recommended Controls
Rig operation (continued)	Jacks/outriggers	Outriggers will be extended per the manufacturer's specifications. Ensure proper footing and cribbing.
	Hoists	Hoists will be used only for their designed intent and will not be loaded beyond their rated capacity. Steps will be taken to prevent two-blocking of hoists. The equipment manufacturer's procedures will be followed if rope becomes caught in, or objects pulled into, a cathead.
	Fire	Keep areas adjacent to derricks reasonably free from accumulation of oil, fuel, or other materials (good housekeeping).
		Have fire extinguishers inspected and readily available.
		Real time air monitoring will take place for LEL/O ₂ .
	Noise	Hearing protection is mandatory above 85 dbA.
		Safe lockout procedures for maintenance work.
	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs require assistance or mechanical equipment size-up the lift. Recommend wearing a back support if possible.
	Slip, trip, and fall hazards	Good housekeeping, keep work area picked up and clean as feasible. Continually inspect the work area for slip, trip and fall hazards.
	Contact with potentially contaminated materials	Real time air monitoring will take place. If necessary, proper personal protective clothing and equipment will be utilized. Modified "D" will be the lowest level of protection due to the high potential for skin contact.
	Contact with utility lines (gas, electric, etc.) and buried drums, etc.	Use magnetometer or other metal detector devices to check for buried drums, cylinders, USTs, etc.
	Inclement weather, lightning	Weather conditions will be monitored. Operations will cease during electrical storms or when electrical storms are imminent.
	Fall hazards	Use safety full-body harness, shock absorbing lanyard with double locking hooks, and lifeline when working above 6 feet.
		Open bore holes will be capped and flagged. Open excavations will be barricaded.
	Welding	Use HS 314 procedures do not watch arc or arc reflection.
	Contact with potentially contaminated utilized	Real-time air monitoring will take place. Proper personal protective clothing and equipment will be utilized.
		Good housekeeping will be stressed to safe guard against cross contamination of surrounding areas and eliminate safety hazards.
		All site personnel will practice good personal hygiene.

ACTIVITY HAZARD ANALYSIS
Geoprobe (Continued)

Activity	Potential Hazards	Recommended Controls
Rig Operation (continued)	Contact with potentially contaminated utilized (continued)	The work area will be demarcated. All unnecessary personnel will be kept out of the work area and in an upwind location.
Staging equipment	Slip, trip, and fall hazards	Determine best access route before transporting equipment hazards.
		Good housekeeping, keep work area picked up and clean as feasible. Continually inspect the work area for slip, trip and fall hazards.
		Look before you step, insure safe and secure footing.
	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs. require assistance or mechanical equipment; size-up the lift. Recommend wearing a back support if possible.
	Falling objects	Stay alert and clear of materials suspended overhead. Use steel-toed boots and hard hat
	Flying debris, dirt, dust etc.	Use safety glasses/goggles. Ensure that eye wash is in good working order.
	Pinch points	Keep hands, fingers, and feet clear of moving/suspended materials and equipment.
		Beware of contact points.
		Stay alert at all times!
	Bees, spiders, and snakes	Inspect work area carefully and avoid placing hands and feet into concealed areas.
	Cut hazards	Wear adequate hand protection. Use care when handling glassware.
	Fire	Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition. See Program Health and Safety Plan.
	Fire/chemical exposure	All solvents will be transported in UL/FM approved containers and sources of ignition will be prohibited.
	Contact with moving equipment/vehicles	Initial real time air monitoring will take place.
		Work area will be barricaded/demarcated.
		Equipment will be laid out in an area free of traffic flow.
	Hazard communication	Label all containers as to contents and dispose of properly.
		Obtain Material Safety Data Sheets for solvents, etc. that are being used.
	Noise	Sound levels above 85 dBA mandates hearing protection.
	Electrical shock	All electrical circuits will be deenergized and locked out
	Bees, spiders, and snakes	Inspect work areas carefully and avoid placing hands and feet into concealed areas.

ACTIVITY HAZARD ANALYSIS
Geoprobe (Continued)

Activity	Potential Hazards	Recommended Controls
Staging equipment (continued)	Cross-contamination and contact with potentially contaminated materials	Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination.
		Only essential personnel will be in the work area.
		Initial real-time air monitoring will take place before and during sampling activities.
		All personnel will follow good hygiene practices.
		Proper decontamination procedures will be followed.
		All liquids and materials used for decontamination will be contained and disposed of in accordance with Federal, State, and Local regulations.
		Use care when handling glassware.
	Cut hazards	Wear adequate hand protection.
Sample Collection	Hazard communication	Label all containers as to contents.
	Strains/sprains	Use the proper tool for the job being performed.
		Get assistance if needed.
		Avoid twisting/turning while pulling on tools, grates, manway covers, etc.
	Spills/residual materials	Absorbent material and containers will be kept available where leaks or spills may occur.
	Lighting	Adequate lighting will be provided to insure a safe working environment
	Unattended worker	"Buddy System" - visual contact will be maintained with the sampling technician during sampling activities.
		Contact with potentially contaminated materials.
		Real-time air monitoring will take place. Appropriate PPE will be used.
		Good housekeeping will be stressed to safeguard against cross contamination of nearby areas and eliminate safety hazards.
		All site personnel will practice good personal hygiene by utilizing the decon facility on site.
		The work area will be demarcated. All unnecessary personnel will be kept out of the work area and in an upwind location.
		IT Policy and Procedure HS601 - "Respiratory Protective Devices," will be adhered to at all times.
Equipment decontamination	Chemical exposure	Maintain MSDSs for any preservatives such as HCl acid. Follow protection procedures.
		Maintain MSDSs for all chemicals such as methanol or hexane and follow protection procedures.

ACTIVITY HAZARD ANALYSIS
Geoprobe (Continued)

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Activity	Potential Hazards	Recommended Controls
Moving and shipping collected samples	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs. require assistance or mechanical equipment; size-up the lift. Recommend wearing a back support if possible.
		Moving and shipping collected samples
	Pinch points	Keep hands, fingers, and feet clear of moving/suspended materials and equipment.
		Beware of contact points.
		Stay alert at all times!
	Cut hazards	Wear adequate hand protection. Use care when handling glassware.
	Hazard communication	Label all containers as to contents and associated hazards.
	Training	See Section 9.0 of SHSP.
Equipment to be Used	Inspection Requirements	Training Requirements
<ul style="list-style-type: none"> • Hand tools • PPE • Heavy equipment • Sampling rig • Sampling equipment 	<ul style="list-style-type: none"> • Pre-/post-maintenance • Visual prior to use • CESPID 150-R 	<ul style="list-style-type: none"> • Tailgate safety meeting • Site-specific orientation • Hazardous waste operations • Hazard communication

ACTIVITY HAZARD ANALYSIS
Mobilization/Demobilization

Page 1 of 2

Principal Steps	Potential Hazards	Recommended Controls
Placement/unloading of equipment and materials	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs require assistance or mechanical equipment; size-up the lift. Use back support if possible.
	Noise	Hearing protection is mandatory above 85 dBA.
	Falling objects	Use hardhat, stay alert and clear of materials suspended overhead, wear steel-toed boots.
	Flying debris, dirt, dust, etc.	Use safety glasses/eye wash.
	Pinch points	Keep hands and feet clear of moving/suspended materials and equipment.
		Stay alert at all times!
		Beware of contact points.
	Fire	Ensure that fire extinguishers are suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
		Establish fire lanes providing access to all areas and maintain free of obstruction (the minimum space between one-story non-fire-resistant buildings shall be 20 feet). Obtain an initial survey of the suitability and effectiveness of fire prevention and protection measures and facilities at each installation by competent persons.
	High winds	Anchor mobile/portable facilities to withstand high winds.
	Hot work	Refer to Health and Safety Policy HS 314.
	Vehicle traffic	Pay attention at all times.
		Ensure that vehicle operators know that you are near their equipment.
Installation of office and support structures	Contact with utilities	Locate aboveground and underground utilities. Use a qualified person to install required utilities in compliance with national, state, and local codes.
	Slip, trip, and fall hazards	Determine best access route before transporting equipment.
		Maintain good housekeeping practices, keep work area picked up and as clean as feasible. Continually inspect the work area for slip, trip, and fall hazards.
		Look before you step, ensure safe and secure footing.
	Cut hazards	Wear adequate hand protection.
	Biological hazards	Inspect work area carefully and avoid placing hands or feet into concealed areas.
		Be alert for bees, spiders, ticks, and snakes.
	Hazardous plants (poison oak prevalent), insects, snakes, etc. (biological)	Remove vegetation; identify hazardous plants, insects, etc.

ACTIVITY HAZARD ANALYSIS
Mobilization/Demobilization (Continued)

Page 2 of 2

Principal Steps	Potential Hazards	Recommended Controls
Installation of office and support structures (continued)	Flood potentials	Check meteorology/climatology of area, history of flooding.
	Toilets (sanitary)	Chemical toilets provided in accordance with SHSP.
	Heat stress	Refer to Section 4.5 of SHSP.
	Fire	Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and fully charged and operable.
		Fuel will be transported and stored in approved containers.
	Contact with moving equipment/vehicles	Work area will be barricaded/ demarcated.
	Hazard communications	Label all containers as to contents (fuel cans, etc.)
		Obtain Material Safety Data Sheets for materials brought on site.
	Cross-contamination and contact with potentially contaminated materials	No Exclusion Zone activities are associated with this task.
	Strains and sprains	Use the proper tool for the job being performed.
		Get assistance if needed.
		Avoid twisting/turning while pulling on tools, materials, etc.
	Unattended worker	Maintain "buddy system" of visual contact between personnel during site activities.
Mobilization of trailers	Driving over soft ground	Perform an initial visual check. Level the ground surface with a loader and spread gravel.
		Apply gravel as needed to prevent mud or standing water. Ensure that any loaders used meet all safety requirements.
	Level/Blocking trailer, driving stakes (stabilization) anchoring	Use caution when jacking and placing blocks or cribbing. If ground is soft, add stone to secure footing.
	Setting steps in place	Steps must be OSHA-approved (with proper handrails, midrail, steps, with a platform in front of door; Refer to USACE (Section 21.E 02, 05, 07, 08)
		Lighting for work and means of egress; electrical hookup to trailers to be made by qualified electrician. GFCIs required on all circuits.
	Clearing hazards	If clearing is necessary, tree cutting will comply with chainsaw safety standards.
	Ventilation	Trailer ventilation shall not bring in exhaust from vehicles, etc.
Equipment to be Used	Inspection Requirements	Training Requirements
<ul style="list-style-type: none"> Hand tools PPE Heavy equipment Vendor trucks 	<ul style="list-style-type: none"> Pre-/post-maintenance Visual prior to use 	<ul style="list-style-type: none"> Tailgate safety meeting Site-specific orientation Hazard communication

ACTIVITY HAZARD ANALYSIS
Utility Clearance/Surveying

Page 1 of 1

Activity	Potential Hazards	Recommended Controls
Surveying	Slips, trips, and falls	Good housekeeping, keep work area picked up and as clean as feasible.
		Continually inspect the work areas for slip, trip, and fall hazards.
		When working on uneven surfaces, take care when stepping. Watch where you walk.
	Moving vehicles	The wearing of high-visibility vests is required in areas where vehicle traffic may be encountered.
		Flaggers and traffic control devices such as cones and barricades may be needed when working in traffic.
Equipment to be Used	Inspection Requirements	Training Requirements
<ul style="list-style-type: none"> Survey Equipment PPE 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Tailgate safety meeting Site-specific orientation Hazard communications

ACTIVITY HAZARD ANALYSIS
Groundwater Well Drilling, Installation, and Monitoring

Page 1 of 3

Activity	Potential Hazards	Recommended Controls
Drill rig inspection	Faulty or damaged equipment being utilized to perform work	All machinery or mechanized equipment will be inspected by a competent mechanic and be certified to be in safe operating condition.
		Equipment will be inspected before being put to use and at the beginning of each shift.
		Faulty/unsafe equipment will be tagged and if possible locked out.
		Earth drilling equipment will be equipped with two easily-accessible emergency shutdown devices, one for the operator and one for the helper.
Drill rig staging	Uneven terrain, poor ground support, inadequate clearances, contact with utilities	Earth drilling equipment will not be transported with the mast up. The exceptions are: movement over level, smooth terrain; the path of travel has been inspected for stability and the absence of holes, other ground hazards, and electrical hazards; and the travel distance is limited to short, safe distances. The equipment operator will ascertain proper clearance prior to moving equipment. Clearance will be monitored by a spotter or by the use of an electrical proximity warning device.
		Machinery and mechanized equipment will be operated only by designated personnel.
		Above ground and below ground utilities will be located prior to staging equipment.
		Whenever the equipment is parked, the parking brake will be set. Equipment parked on inclines will have the wheels chocked.
		Inspect brakes and tire pressure on drill rig.
	Overhead power lines	See distances (Table 4-1 in the SSHP).
Drill rig operation	General	IT H&S Procedure HS316 will be adhered to.
	Inexperienced operator	Machinery and mechanized equipment will be operated only by designated personnel.
		The operator will verbally alert employees and visually ensure that employees are clear from dangerous parts of equipment prior to starting or engaging equipment.
	Falling objects	Hard-hats; remove unsecured tools and materials before raising or lowering the derrick.
		Stay alert and clear of materials suspended overhead.
	Pinch points	Keep feet and hands clear of moving/suspended materials and equipment.
		Inspect for all pinch points.
		Stay alert at all times!!!

ACTIVITY HAZARD ANALYSIS

Page 2 of 3

Groundwater Well Drilling, Installation, and Monitoring (Continued)

Activity	Potential Hazards	Recommended Controls
Drill rig operation (continued)	Jacks/outriggers	Outriggers will be extended per the manufacturer's specifications. Ensure proper footing and cribbing.
	Hoists	Hoists will be used only for their designed intent and will not be loaded beyond their rated capacity. Steps will be taken to prevent two-blocking of hoists.
		The equipment manufacturer's procedures will be followed if rope becomes caught in, or objects pulled into, a cathead.
		Drill rods will be neither run nor rotated through rod slipping devices. No more than one foot of drill rod column will be hoisted above the top of the drill mast. Drill rod tool joints will not be made up, tightened, or loosened while the rod column is supported by a rod slipping device.
	Whip lines and cables	Stand clear when under tension.
	Fire	Keep areas adjacent to derricks reasonably free from accumulation of oil, fuel, or other materials (good housekeeping).
		Have fire extinguishers inspected and readily available.
		Real-time air monitoring will take place for LEL/O ₂ .
	Noise	Hearing protection is mandatory above 85 dbA.
	Contact with rotating or reciprocating machine parts	Machine guards, use long-handled shovels to remove auger cuttings.
		Safe lockout procedures for maintenance work.
	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs require assistance or mechanical equipment size-up the lift. Recommend wearing a back support if possible.
	Slip, trip, and fall hazards	Good housekeeping, keep work area picked up and clean as feasible. Continually inspect the work area for slip, trip and fall hazards. Assure no holes in walkways exist that are greater than 12 inches x 12 inches.
	Contact with potentially contaminated materials and poison oak	Real time air monitoring will take place. If necessary, proper personal protective clothing and equipment will be utilized. Modified "D" will be the lowest level of protection due to the high potential for skin contact.
	Auger binding or breaking	Auger guides will be used on hard services.
	Contact with potentially contaminated materials	Utilize appropriate PPE.
	Special conditions	Climbing booms, or any hazardous operations out of the normal use of drill will not be conducted without approval of SSHO.

ACTIVITY HAZARD ANALYSIS

Page 3 of 3

Groundwater Well Drilling, Installation, and Monitoring (Continued)

Activity	Potential Hazards	Recommended Controls
Drill rig operation (continued)	Contact with utility lines (gas, electric, etc.) and buried drums, etc.	Use magnetometer or other metal detector devices to check for buried drums, cylinders, USTs, etc.
	Buried ordnances, chemical warheads, etc.	Use ordnance detector with experienced personnel and/or remote control drill rig.
	Inclement weather, lightning	Weather conditions will be monitored. Operations will cease during electrical storms or when electrical storms are imminent.
	Fall hazards	Use safety full-body harness, shock absorbing lanyard with double locking hooks, and lifeline when working above 6 feet.
		Open bore holes will be capped and flagged. Open excavations will be barricaded.
	Welding	Do not watch arc or arc reflection.
Equipment to be Used	Inspection Requirements	Training Requirements
<ul style="list-style-type: none"> • Hand tools • PPE • Heavy equipment • Drilling rig • Service truck • Bentonite mixer 	<ul style="list-style-type: none"> • Pre-/post-maintenance • Visual prior to use 	<ul style="list-style-type: none"> • Tailgate safety meeting • Site-specific orientation • Hazardous waste operations • Hazard communication

ACTIVITY HAZARD ANALYSIS
Soil/Water Sampling

Page 1 of 3

Activity	Potential Hazards	Recommended Controls
Staging equipment	Slip, trip, and fall hazards	Determine best access route before transporting equipment.
		Good housekeeping, keep work area picked up and as clean as feasible. Continually inspect the work area for slip, trip, and fall hazards.
		Look before you step, insure safe and secure footing.
	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs require assistance or mechanical equipment; size-up the lift.
	Falling objects	Stay alert and clear of materials suspended overhead. Use steel-toed boots and hard-hat.
	Flying debris, dirt, dust etc.	Use safety glasses/goggles. Ensure that eye wash is in good working order.
	Pinch points	Keep hands, fingers, and feet clear of moving/suspended materials and equipment.
		Beware of contact points.
		Stay alert at all times!
	Insects, spiders, and snakes	Inspect work area carefully and avoid placing hands and feet into concealed areas.
	Cut hazards	Wear adequate hand protection. Use care when handling glassware.
	Fire	Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully-charged and operable condition. See Table 3-6.
	Fire/chemical exposure	All solvents will be transported in UL/FM approved containers and sources of ignition will be prohibited.
		Initial real time air monitoring will take place.
	Contact with moving equipment/vehicles	Work area will be barricaded/demarcated.
		Equipment will be laid out in an area free of traffic flow.
	Work in excavations	IT Policy and Procedure HS 307 - "Excavation and Trenching," will be adhered to at all times.
	Hazard communication	Label all containers as to contents and dispose of properly.
		Obtain Material Safety Data Sheets for solvents, etc. that are being used.
	Noise	Sound levels above 85 dBA mandate hearing protection.
Sample collection	Working at elevated heights/falls	Ladders will be secured by top, bottom, and intermediate fastenings, as required.
		Personnel working at heights of 6 feet or more must be secured with fall protection (safety belt/lanyard).
	Electrical shock	All electrical circuits will be deenergized and locked out.

ACTIVITY HAZARD ANALYSIS
Soil/Water Sampling (Continued)

Page 2 of 3

Activity	Potential Hazards	Recommended Controls
Sample collection (continued)	Insects, spiders, and snakes	Inspect work areas carefully and avoid placing hands and feet into concealed areas.
	Cross-contamination and contact with potentially contaminated materials	Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination.
		Only essential personnel will be in the work area.
		Initial real-time air monitoring will take place before and during sampling activities.
		All personnel will follow good hygiene practices.
		Proper decontamination procedures will be followed.
		All liquids and materials used for decontamination will be contained and disposed of in accordance with Federal, State, and Local regulations.
	Cut hazards	Use care when handling glassware.
		Wear adequate hand protection.
	Hazard communication	Label all containers as to contents.
	Strains/sprains	Use the proper tool for the job being performed.
		Get assistance if needed.
	Strains/sprains	Avoid twisting/turning while pulling on tools, grates, manway covers, etc.
	Spills/residual materials	Absorbent material and containers will be kept available where leaks or spills may occur.
	Lighting	Adequate lighting will be provided to insure a safe working environment.
	Unattended worker	"Buddy System" - visual contact will be maintained with the sampling technician during sampling activities.
	Confined spaces	IT Policy and Procedure HS300 - "Confined Spaces" will be adhered to at all times.
	Contact with potentially contaminated materials	Real-time air monitoring will take place. Appropriate PPE will be utilized.
		Good housekeeping will be stressed to safeguard against cross contamination of nearby areas and eliminate safety hazards.
		All site personnel will practice good personal hygiene by utilizing the decon facility on site.
		The work area will be demarcated. All unnecessary personnel will be kept out of the work area and in an upwind location.
		IT Policy and Procedure HS601 - "Respiratory Protective Devices" will be adhered to at all times.
		Maintain MSDS's for any preservatives such as HCl acid. Follow protection procedures.

ACTIVITY HAZARD ANALYSIS
Soil/Water Sampling (Continued)

Page 3 of 3

Activity	Potential Hazards	Recommended Controls
Equipment decontamination	Chemical exposure	Maintain MSDS's for all chemicals such as methanol or hexane and follow protection procedures.
On-site sample analysis	Various	On-site laboratory will develop and adhere to a site specific chemical hygiene plan (CHP). The CHP will be submitted to the Program CIH for review and acceptance.
Moving and shipping collected samples	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs. require assistance or mechanical equipment; size-up the lift.
Moving and shipping collected samples	Pinch points	Keep hands, fingers, and feet clear of moving/suspended materials and equipment.
		Beware of contact points.
		Stay alert at all times!
	Cut hazards	Wear adequate hand protection. Use care when handling glassware.
	Hazard communication	Label all containers as to contents and associated hazards.
Equipment to be Used	Inspection Requirements	Training Requirements
<ul style="list-style-type: none"> • Hand tools • PPE • Sampling equipment 	<ul style="list-style-type: none"> • Pre-postmaintenance • Visual prior to use 	<ul style="list-style-type: none"> • Tailgate safety meeting • Site-specific orientation • Hazardous waste operations • Hazard communication

ACTIVITY HAZARD ANALYSIS
Concrete Core Sampling

Page 1 of 2

Activity	Potential Hazards	Recommended Controls
Concrete core sampling	Rotating hole saw	Beware of contact points
		Keep hands, feet, and any loose fitting clothing clear of rotating saw blades.
		Remain alert while around rotating equipment.
	Pinch point/cuts	Adequate hand protection and observation of all contact points.
	Electrical shock	All equipment must be GFCI equipment.
	Hazard communication	Hazard communication program, proper labeling, MSDSs available on site.
	Slips, trips, and falls	Good housekeeping in and around work area.
	Flammable and combustible liquids	Store in a no smoking area 50' from combustible construction materials.
		Fire extinguishers must be readily available at the site.
		Equipment must be properly bonded and grounded.
	Contact with drilled materials	Personnel will wear proper personal protective equipment and clothing to protective themselves against contact with wet concrete.
	Flying debris	Safety glasses and faceshield will be worn while coring is ongoing.
		Eyewash station to be available and maintained in good working order.
	Lighting	Adequate lighting will be provided to insure a safe working environment.
	Contact with personnel and equipment	Work area will be barricaded/demarcated.
	Dust	All concrete coring to be done utilizing wet methods.
	Heavy lifting	Use proper lifting techniques. Use mechanical devices or team lifting during heavy lifts.
	Noise	If noise levels exceed 85 dBA, wear hearing protection.

ACTIVITY HAZARD ANALYSIS
Concrete Core Sampling (Continued)

Page 2 of 2

Equipment to be Used	Inspection Requirements	Training Requirements
<ul style="list-style-type: none">• Coring equipment• Hand tools	<ul style="list-style-type: none">• Visual prior to use	<ul style="list-style-type: none">• Tailgate safety meeting• Site-specific orientation• Hazardous waste operations• Hazard communication

Trenching

Principal Steps	Potential Hazards	Recommended Controls
Trenching	Underground utilities	All underground utilities will be located prior to excavating.
	Open trenches	IT Policy and Procedure HS307-"Excavation and Trenching," will be adhered to at all times.
	Contact with potentially contaminated materials	Real-time air monitoring will take place. If necessary, proper personal protective clothing and equipment will be used.
	Noise	Noise levels above 85 dBA mandate hearing protection.
	Equipment operations	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.
		Equipment shall be inspected before being placed into service and at the beginning of each shift.
		Preventative maintenance procedures recommended by the manufacturer shall be followed.
		A lockout-tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.
		Machinery and mechanized equipment shall be operated only by designated personnel.
		Machinery or equipment requiring an operator shall not be permitted to run unattended.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
		All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.
		All repairs on machinery or equipment will be made at a location which provides protection from traffic for repair persons.
	Fire	A dry-chemical fire extinguisher will be readily available.
	Pinch points	Keep hands, fingers, and feet clear of moving parts.
	Heavy lifting	Any lifting over 60 lbs requires assistance or the use of a mechanical lifting device.
	Slip, trip, and fall hazards	Good housekeeping; keep work area picked up and as clean as feasible. Continually inspect the work area for slip, trip, and fall hazards. Look where you step, ensure safe footing.
	Cut hazards	Wear adequate hand protection.

ACTIVITY HAZARD ANALYSIS

Page 2 of 2

Trenching (Continued)

Principal Steps	Potential Hazards	Recommended Controls
Trenching (continued)	Traffic	Work area will be barricaded off.
		Personnel will wear reflective vests for high visibility.
	Hazard communication	Obtain MSDSs for materials used on site. Label all containers as to contents.
Equipment to be Used	Inspection Requirements	Training Requirements
<ul style="list-style-type: none"> • Heavy equipment • Shoring devices 	<ul style="list-style-type: none"> • Pre-/post-maintenance • Visual prior to use • CESP Form 150 R 	<ul style="list-style-type: none"> • Tailgate safety meeting • Site specific orientation • Hazardous waste operations • Hazard communication • Excavation safety

ACTIVITY HAZARD ANALYSIS

Drum Handling

Page 1 of 4

Activity	Potential Hazards	Recommended Controls
Staging equipment	Contact with moving equipment/vehicles	Area around drums will be barricaded/demarcated.
		Equipment will be laid out in an area free of traffic flow.
	Cut hazards	Use care when handling any glassware.
		Wear adequate hand protection
Collect samples	Chemical contamination	Drum sampling will be performed in Level B PPE.
	Hazard communication	Label all containers as to contents.
	Cuts	Use care when handling glassware.
		Wear adequate hand protection.
Drum opening	Fire/Explosion	All equipment and tools will be of the type to prevent sources of ignition.
		Only essential personnel will be in drum opening area.
		Suspect drums will be opened using a beryllium or bronze spike.
		Bungs will be opened slowly without excessive pressure.
		Fire extinguishers will be available to control small fires.
		Only intrinsically safe equipment will be used to transfer contents of suspect drums.
		Real-time monitoring will take place before and during drum opening/handling.
Drum handling	Spills	Absorbent and overpack drums will be kept available where leaks, spills, or ruptures may occur.
	Contact with potentially contaminated materials	Drum handling will be performed in Level B PPE.
	Sprain/strains	Use caution when removing drum lids.
		Use the proper tool for the task being performed.
		Get assistance, if required.
		Avoid twisting/turning while pulling on tools or drums.
	Heavy lifting	Lift with your legs, not your back.
		Lifts greater than 60 lbs require assistance or mechanical equipment; size up the lift.
	Pinch points	Keep feet and hands clear of moving materials and equipment.
		Beware of contact points.
		Stay alert at all times.
	Cut hazards	Wear adequate hand protection

ACTIVITY HAZARD ANALYSIS
Drum Handling (Continued)

Page 2 of 4

Activity	Potential Hazards	Recommended Controls
Drum transfer	Noise	Noise levels above 85 dBA mandate hearing protection.
	Heavy equipment operations	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.
		Equipment shall be inspected before being placed into service and at the beginning of each shift.
		Preventive maintenance procedures recommended by the manufacturer shall be followed.
		A lockout - tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.
		Machinery and mechanized equipment shall be operated only by designated personnel.
		Getting on or off any equipment while it is in motion is prohibited.
		Machinery or equipment requiring an operator shall not be permitted to run unattended.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
		All machinery or equipment will be shutdown and positive means taken to prevent its operation while repairs or manual lubrications are being done.
		All repairs on machinery or equipment will be made at a location which provides protection from traffic for repair persons.
		All self-propelled construction equipment shall be equipped with a back-up alarm.
	Fire	Equipment will be equipped with at least one dry-chemical fire extinguisher having a minimum UL rating of 1A5BC.
	Truck and equipment traffic	Site personnel will wear orange safety vests to identify themselves to traffic.
		Load out area will be properly demarcated.
	Slip, trip, and fall hazards	Good housekeeping; keep work area picked up and as clean as feasible. Continually inspect the work area for slip, trip, and fall hazards. Look where you step, ensure safe footing when climbing on/off equipment etc.
Drum storage	Incompatible drums	Segregate drums so that no incompatibles are stored next to each other.

ACTIVITY HAZARD ANALYSIS
Drum Handling (Continued)

Page 3 of 4

Activity	Potential Hazards	Recommended Controls
Drum transfer	Pinch points	Keep feet and hands clear of moving/suspended materials and equipment.
		Beware of contact points. Stay alert at all times!
	Sprain/strains	Use proper lifting techniques. Lifts greater than 60 lbs require assistance or mechanical equipment. Size-up the lift. Recommend wearing a back support if possible. When pulling on materials, pull in a straight line. Do not twist and pull simultaneously.
	Ropes, slings, chains, and hooks	The use of ropes, slings, and chains shall be in accordance with the safe recommendations of their manufacturer.
		Rigging equipment shall not be loaded in excess of its recommended safe working load.
		The use of open hooks is prohibited in rigging to lift any load where there is danger of relieving the tension on the hook due to the load or hook catching or fouling.
		Hooks, shackles, rings, pad eyes, and other fittings that show excessive wear or that have been bent, twisted, or otherwise damaged shall be removed from service.
		Rigging equipment for material handling shall be inspected prior to use on each shift and as necessary during its use to insure that it is safe. Defective rigging equipment shall be removed from service.
		Rigging equipment, when not in use, shall be removed from the immediate work area and properly stored so as not to present a hazard.
		Taglines shall be used to control the loads being handled by hoisting equipment.
	Hoisting equipment	All hoisting equipment shall be capable of passing a performance (operating) test prior to being placed into service.
		At no time shall the hoisting equipment be loaded in excess of the manufacturers' rating except during performance tests.
		While hoisting equipment is in operation, the operator shall not perform any other work and he/she shall not leave his/her position at the controls until the load has been safely landed or returned to the ground.
		A standard signal system shall be used on all hoisting equipment.
	Insects, spiders, and snakes	Inspect work area carefully and avoid placing hands and feet into concealed areas.

ACTIVITY HAZARD ANALYSIS
Drum Handling (Continued)

Page 4 of 4

Activity	Potential Hazards	Recommended Controls
Drum transfer (continued)	Cut hazards	Wear adequate hand protection.
	Falling objects	Hard-hat, stay alert and clear of materials suspended overhead, wear steel-toed boots.
Equipment to be Used	Inspection Requirements	Training Requirements
<ul style="list-style-type: none"> • Drum dolly/grappler • PPE • Hoisting equipment 	<ul style="list-style-type: none"> • Pre-/post-maintenance • Visual prior to use 	<ul style="list-style-type: none"> • Tailgate safety meeting • Site-specific orientation • Hazardous waste operations • Hazard communication • Drum handling

ACTIVITY HAZARD ANALYSIS
Installation/Removal of Sheet Pile

Page 1 of 3

Activity	Potential Hazards	Recommended Controls
Installation/removal of sheet pile	Staging equipment	Signal person will assist in positioning equipment.
	Uneven terrain and poor ground support	Inspections or determinations of road conditions and structure shall be made in advance to assure that clearances and load capacities are safe for the passage or placing of any machinery or equipment.
	Hoisting equipment	Ensure that the crane is level, and where necessary, blocked
		Ensure that the load is secured and balanced in the sling or lifting device before lift.
		Ensure that the lift and swing path is clear of obstructions and adequate clearance is maintained from electrical sources.
		Ensure that all persons are clear of the swing radius of the counter weight.
		At no time shall the hoisting equipment be loaded in excess of the manufacturers rating.
		While hoisting equipment is in operation, the operator shall not perform any other work and he/she shall not leave his/her position at the controls until the load has been safely landed or returned to the ground.
		A standard signal system shall be used on all hoisting equipment.
	Contact with overhead power lines	See Program Health and Safety Plan.
	Ropes, slings, chains and hooks	Rigging equipment for material handling shall be inspected prior to use on each shift and as necessary during its use to insure that it is safe. Defective rigging equipment shall be removed from service.
		Hooks, shackles, rings, pad eyes and other fittings that show excessive wear or that have been bent, twisted or otherwise damaged shall be removed from service.
		Rigging equipment shall not be loaded in excess of its recommended safe working load.
		The use of ropes, slings and chains shall be in accordance with the safe recommendations of their manufacturers.
		The use of open hooks is prohibited in rigging to lift any load where there is danger of relieving the tension on the hook due to the load or hook catching or fouling.
		Rigging equipment, when not in use, shall be removed from the immediate work area and properly stored so as not to present a hazard.
		Taglines shall be used to control the loads being handled by hoisting equipment.
	Falling objects	Remove unsecured tools and materials before operating equipment.

ACTIVITY HAZARD ANALYSIS
Installation/Removal of Sheet Pile (Continued)

Page 2 of 3

Activity	Potential Hazards	Recommended Controls
Installation/removal of sheet pile (continued)		Stay clear of materials suspended overhead.
	Pinch points	Keep feet and hands clear of moving/suspended materials and equipment.
		Beware of contact points.
		Stay alert at all times!
	Cut hazards	Wear adequate hand protection
	Strains and sprains/heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs. requires assistance or mechanical equipment; size up the lift.
	Slip, trip and fall hazards	Good housekeeping, keep work area picked up and as clean as feasible. Continually inspect the work areas for slip, trip and fall hazards.
	Noise	Noise levels above 85 dBA mandates hearing protection.
	Underground utilities	All underground utilities will be located prior to excavating.
	Open excavations	IT Policy and Procedure HS 307 - "Excavation and Trenching" will be adhered to at all times.
	Confined spaces	IT Policy and Procedure HS 300 - "Confined Spaces" will be adhered to at all times.
	Heavy equipment operations	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.
		Equipment shall be inspected before being placed into service and at the beginning of each shift.
		Preventive maintenance procedures recommended by the manufacturer shall be followed.
		A lockout-tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.
		Machinery and mechanized equipment shall be operated only by designated personnel.
		Getting off or on any equipment while it is in motion is prohibited.
		Machinery or equipment requiring an operator shall not be permitted to run unattended.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
		All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.
		All repairs on machinery or equipment will be made at a location which provides protection from traffic for repair persons.

ACTIVITY HAZARD ANALYSIS
Installation/Removal of Sheet Pile (*Continued*)

Page 3 of 3

Activity	Potential Hazards	Recommended Controls
Installation/removal of sheet pile (continued)	Heavy equipment operations (continued)	Bulldozer and scraper blades, end-loader buckets, and similar equipment will be either fully lowered or blocked when being repaired or when not in use. All self-propelled construction equipment shall be equipped with a back-up alarm.
	Contact with overhead power lines	See Program Health and Safety Plan.
	Fire	Each bulldozer, backhoe, or other similar equipment will be equipped with at least one dry chemical fire extinguisher having a minimum UL rating of 5 A:B:C.
Equipment to be Used	Inspection Requirements	Training Requirements
<ul style="list-style-type: none"> • Heavy equipment • Crane • Rigging • Vibratory hammer 	<ul style="list-style-type: none"> • CESPID 150-R • IT Procedure HS 822 • "Mobile Crane Inspection" • Pre and post maintenance • Prior to use 	<ul style="list-style-type: none"> • Tailgate safety meeting • Site specific orientation • Hazardous waste operations • Hazard communication • Crane operations

ATTACHMENT 4
PROPOSITION 65 NOTICE AND MATERIAL SAFETY DATA SHEETS

Proposition 65 Warning and Notification

As required under the Safe Drinking Water and Toxic Enforcement Act of 1986 (also known as Proposition 65), on February 27, 1987, the Governor published a listing of those chemicals determined by the State of California to cause cancer, birth defects, or other reproductive harm. Proposition 65 requires that businesses that handle any of the listed chemicals notify people in the affected area of that fact. IT Corporation anticipates handling some of the listed chemicals at the Alameda Point Field Sampling Investigation in Alameda, California.

The chemicals present on site that have been determined to cause cancer include:

- Benzene
- Arsenic
- Beryllium
- Cadmium
- Benzo(a)pyrene (PAHs)
- Diesel engine exhaust
- Gasoline engine exhaust

The following contaminants on site have been determined by the State to cause reproductive harm:

- Arsenic
- Cadmium

AGE REFINING & MARKETING -- DIESEL FUEL OIL - DIESEL FUEL
MATERIAL SAFETY DATA SHEET
NSN: 9140002865295
Manufacturer's CAGE: OT116
Part No. Indicator: A
Part Number/Trade Name: DIESEL FUEL OIL

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General Information
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Item Name: DIESEL FUEL
Company's Name: AGE REFINING AND MARKETING
Company's Street: 7811 S PRESA
Company's City: SAN ANTONIO
Company's State: TX
Company's Country: US
Company's Zip Code: 78223-3531
Company's Emerg Ph #: 512-532-5300
Company's Info Ph #: 512-532-5300
Record No. For Safety Entry: 020
Tot Safety Entries This Stk#: 092
Status: SE
Date MSDS Prepared: 13APR92
Safety Data Review Date: 11AUG93
Supply Item Manager: KY
MSDS Serial Number: BRJJH
Specification Number: VV-F-800
Spec Type, Grade, Class: GRADE DF-2
Hazard Characteristic Code: F4
Unit Of Issue: DR
Unit Of Issue Container Qty: 5 GAL
Type Of Container: CAN
Net Unit Weight: 33.8 LBS

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Ingredients/Identity Information
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Proprietary: NO
Ingredient: LIGHT HYDROCARBON BLEND, CAS NO. 8008-20-6 CAS NO. 64741-44-2
CAS NO. 64742-88-7
Ingredient Sequence Number: 01
Percent: 100%
NIOSH (RTECS) Number: 1000011HC
OSHA PEL: UNKNOWN
ACGIH TLV: UNKNOWN
Other Recommended Limit: NONE RECOMMENDED

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Physical/Chemical Characteristics
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Appearance And Odor: CLEAR TO YELLOW, TYPICAL HYDROCARBON ODOR.
Boiling Point: 360-572F
Melting Point: NA
Vapor Pressure (MM Hg/70 F): 0.1
Vapor Density (Air=1): NA
Specific Gravity: 0.81-0.86
Decomposition Temperature: NA
Evaporation Rate And Ref: NA
Solubility In Water: TRACE
Percent Volatiles By Volume: 100
pH: NA
Corrosion Rate (IPY): NA

=====
Fire and Explosion Hazard Data
=====

Flash Point: 100F, 38C

Flash Point Method: PMCC
Lower Explosive Limit: 1
Upper Explosive Limit: 5
Extinguishing Media: FOAM, DRY CHEMICAL, CARBON DIOXIDE. WATER MAY BE INEFFECTIVE. USE WATER TO COOL & PROTECT MATERIAL & MEN, FLUSH SPILL.
Special Fire Fighting Proc: MINIMIZE BREATHING GASES, VAPOR, FUMES OR DECOMPOSITION PRODUCTS. USE SUPPLIED AIR BREATHING APPARATUS IN ENCLOSED OR CONFINED AREAS OR AS OTHERWISE NEEDED.
Unusual Fire And Expl Hazrds: NA

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Reactivity Data

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Stability: YES
Cond To Avoid (Stability): UNDER NORMAL CONDITIONS, THE MATERIAL IS STABLE.
Materials To Avoid: STRONG OXIDANTS SUCH AS LIQUID CHLORINE, CONCENTRATED OXYGEN, SODIUM HYPOCHLORITE OR CALCIUM HYPOCHLORITE.
Hazardous Decomp Products: FUMES, SMOKE, CARBON MONOXIDE, ALDEHYDES AND OTHER DECOMPOSITION PRODUCTS.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): MATERIAL IS NOT KNOWN TO POLYMERIZE.

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Health Hazard Data

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LD50-LC50 Mixture: ORAL LD50 (RAT) IS = 5-15 G/KG
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: ACUTE: CENTRAL NERVOUS SYSTEM DEPRESSION WITH EXTREME EXPOSURE; EFFECTS MAY INCLUDE ANESTHESIA, COMA, RESPIRATORY ARREST, AND IRREGULAR HEART RATE. OXYGEN DEPRIVATION IS POSSIBLE IF WORKING IN A CONFINED AREA. CHRONIC: NO KNOWN MAJOR CUMULATIVE OR LATENT EFFECTS HAVE BEEN REPORTED.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NOT CARCINOGENIC.
Signs/Symptoms Of Overexp: INHALATION-IRRITATION OF THE UPPER RESPIRATORY TRACT, DEPRESSION, DIZZINESS, HEADACHE, UNCOORDINATION, ANESTHESIA, COMA & RESPIRATORY ARREST. SKIN-DEFATTING, IRRITATION & BURNING SENSATION & SWELLING OF LIDS. EYE-SEVERE BURNING SENSATION. INGESTION- IRRITATION OF THROAT, ESOPHAGUS & STOMACH, VOMITING.
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: EYES-FLUSH EYES WITH LARGE AMOUNTS OF WATER FOR 15 MIN. SEEK MEDICAL ATTENTION. SKIN-WASH WITH SOAP AND WATER. REMOVE CONTAMINATED CLOTHES & FOOTWEAR. SEEK MEDICAL ATTENTION. INHALATION-REMOVE TO FRESH AIR; RESTORE BREATHING IF NEEDED; ADMINISTER OXYGEN; SEEK MEDICAL HELP. INGESTION-DO NOT INDUCE VOMITING. IF VOMITING OCCURS, KEEP AIRWAY CLEAR. SEEK MEDICAL ATTENTION IMMEDIATELY.

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Precautions for Safe Handling and Use

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Steps If Matl Released/Spill: ELIMINATE SOURCES OF IGNITION. CONFINED AREA TO CLEANUP PERSONNEL. VENTILATE CONFINED AREAS. USE EXPLOSION PROOF EQUIPMENT. ABSORB &/OR CONFINED LIQUID WITH SAND, EARTH OR OTHER SUITABLE MATERIAL. KEEP PRODUCT OUT OF SEWERS OR WATERCOURSES.
Waste Disposal Method: DISPOSAL OF WASTE MATERIAL ARE REGULATED AND ACTION TO HANDLE OR DISPOSE OF SPILLED OR RELEASED MATERIALS MUST MEET ALL APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.
Precautions-Handling/Storing: PROTECT AGAINST PHYSICAL DAMAGE. OUTSIDE OR DETACHED STORAGE PREFERRED. STORE IN COOL, WELL-VENTILATED AREA AWAY FROM IGNITION SOURCES & OXIDIZERS.
Other Precautions: TO PREVENT FIRE OR EXPLOSION RISK FROM STATIC ACCUMULATION & DISCHARGE, GROUND PRODUCT TRANSFER SYSTEM IN ACCORDANCE WITH

THE NATIONAL FIRE PROTECTION ASSOCIATION FOR PETROLEUM PRODUCTS.

Control Measures

Respiratory Protection: RESPIRATORY PROTECTION NOT REQUIRED UNDER NORMAL USE. USE NIOSH.MSHA APPROVED ORGANIC VAPOR RESPIRATOR FOLLOWING MANUFACTURERS RECOMMENDATIONS WHERE SPRAY, MIST OR VAPORS MAY CAUSE SUGGESTED TLV TO BE EXCEEDED.
Ventilation: WORK IN VENTILATED AREAS. SPECIAL VENTILATION IS NOT REQUIRED UNDER NORMAL USE.
Protective Gloves: IMPERVIOUS GLOVES.
Eye Protection: FACE SHIELD & GOGGLES, CHEMICAL GOGGLES.
Other Protective Equipment: STANDARD WORK CLOTHING. CLOTHES OR FOOTWEAR THAT CANNOT BE DECONTAMINATED SHOULD BE DISCARDED.
Work Hygienic Practices: SHOWER AND EYE WASH FACILITIES SHOULD BE ACCESSIBLE.
Suppl. Safety & Health Data: NOTE TO PHYSICIAN-GASTRIC LAVAGE ONLY IF LARGE QUANTITIES HAVE BEEN INGESTED. GUARD AGAINST ASPIRATION INTO LUNGS WHICH MAY RESULT IN CHEMICAL PNEUMONITIS. IRREGULAR HEART BEAT MAY OCCUR; USE OF ADRENALIN IS NOT ADVISABLE. TREAT SYMPTOMATICALLY.

Transportation Data

Trans Data Review Date: 93223
DOT PSN Code: GJL
DOT Proper Shipping Name: FLAMMABLE LIQUIDS, N.O.S.
DOT Class: 3
DOT ID Number: UN1993
DOT Pack Group: III
DOT Label: FLAMMABLE LIQUID
IMO PSN Code: H1A
IMO Proper Shipping Name: FLAMMABLE LIQUID, N.O.S. o
IMO Regulations Page Number: 3345
IMO UN Number: 1993
IMO UN Class: 3.3
IMO Subsidiary Risk Label: -
IATA PSN Code: MCA
IATA UN ID Number: 1993
IATA Proper Shipping Name: FLAMMABLE LIQUID, N.O.S. *
IATA UN Class: 3
IATA Label: FLAMMABLE LIQUID
AFI PSN Code: MCA
AFI Prop. Shipping Name: FLAMMABLE LIQUIDS, N.O.S.
AFI Class: 3
AFI ID Number: UN1993
AFI Pack Group: III
AFI Basic Pac Ref: 7-7
MMAC Code: NR

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 11AUG93
Label Status: F
Common Name: DIESEL FUEL OIL
Chronic Hazard: YES
Signal Word: WARNING!
Acute Health Hazard-Moderate: X
Contact Hazard-Slight: X
Fire Hazard-Moderate: X
Reactivity Hazard-None: X

AGE REFINING & MARKETING

Special Hazard Precautions: IN CASE OF SPILL: ELIMINATE SOURCES OF IGNITION. CONFINE AREA TO CLEANUP PERSONNEL. VENTILATE CONFINED AREAS. USE EXPLOSION PROOF EQUIPMENT. ABSORB &/OR CONFINE LIQUID WITH SAND, EARTH OR OTHER SUITABLE MATERIAL. KEEP PRODUCT OUT OF SEWERS OR WATERCOURSES. FIRST AID: EYES-FLUSH EYES WITH LARGE AMOUNTS OF WATER FOR 15 MIN. SEEK MEDICAL ATTENTION. SKIN-WASH WITH SOAP AND WATER. REMOVE CONTAMINATED CLOTHES & FOOTWEAR. SEEK MEDICAL ATTENTION. INHALATION-REMOVE TO FRESH AIR; RESTORE BREATHING IF NEEDED; ADMINISTER OXYGEN; SEEK MEDICAL HELP. INGESTION-DO NOT INDUCE VOMITING. IF VOMITING OCCURS, KEEP AIRWAY CLEAR. SEEK MEDICAL ATTENTION IMMEDIATELY.

Protect Eye: Y

Protect Skin: Y

Label Name: AGE REFINING AND MARKETING

Label Street: 7811 S PRESA

Label City: SAN ANTONIO

Label State: TX

Label Zip Code: 78223-3531

Label Country: US

Label Emergency Number: 512-532-5300

AMOCO OIL -- REGULAR LEAD FREE GASOLINE - GASOLINE,AUTOMOTIVE
MATERIAL SAFETY DATA SHEET
NSN: 9130001487102
Manufacturer's CAGE: 15958
Part No. Indicator: A
Part Number/Trade Name: REGULAR LEAD FREE GASOLINE

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General Information

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Item Name: GASOLINE,AUTOMOTIVE
Company's Name: AMOCO OIL COMPANY
Company's Street: 200 EAST RANDOLPH DRIVE MC 1408
Company's City: CHICAGO
Company's State: IL
Company's Country: US
Company's Zip Code: 60601-6401
Company's Emerg Ph #: 800-447-8735 800-424-9300
Company's Info Ph #: 312-856-3931
Record No. For Safety Entry: 021
Tot Safety Entries This Stk#: 053
Status: SE
Date MSDS Prepared: 14JAN91
Safety Data Review Date: 23JUL93
Supply Item Manager: KY
MSDS Preparer's Name: R.G. FARMER
MSDS Serial Number: BRFLJ
Specification Number: VV-G-1690
Spec Type, Grade, Class: CL A,B,C,D,E, GR SPL
Hazard Characteristic Code: F2
Unit Of Issue: GL
Unit Of Issue Container Qty: BULK
Type Of Container: BULK
Net Unit Weight: UNKNOWN
NRC/State License Number: NONE
Net Propellant Weight-Ammo: NONE

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Ingredients/Identity Information

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Proprietary: NO
Ingredient: GASOLINE
Ingredient Sequence Number: 01
Percent: UNKNOWN
NIOSH (RTECS) Number: LX3300000
CAS Number: 8006-61-9
OSHA PEL: 300 PPM/500 STEL
ACGIH TLV: 300 PPM/500STEL;9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: BENZENE (SARA III)
Ingredient Sequence Number: 02
Percent: 4.0
NIOSH (RTECS) Number: CY1400000
CAS Number: 71-43-2
OSHA PEL: 1PPM/5STEL;1910.1028
ACGIH TLV: 10 PPM; A2; 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: ETHYL BENZENE (SARA III)
Ingredient Sequence Number: 03
Percent: 2.0
NIOSH (RTECS) Number: DA0700000

CAS Number: 100-41-4
OSHA PEL: 100 PPM/125 STEL
ACGIH TLV: 100 PPM/125 STEL 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: TOLUENE (SARA III)
Ingredient Sequence Number: 04
Percent: 22.0
NIOSH (RTECS) Number: XS5250000
CAS Number: 108-88-3
OSHA PEL: 200 PPM/150 STEL
ACGIH TLV: 50 PPM; 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: XYLENES (O-,M-,P- ISOMERS) (SARA III)
Ingredient Sequence Number: 05
Percent: 10.0
NIOSH (RTECS) Number: ZE2100000
CAS Number: 1330-20-7
OSHA PEL: 100 PPM/150 STEL
ACGIH TLV: 100 PPM/150 STEL; 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: CYCLOHEXANE (SARA III)
Ingredient Sequence Number: 06
Percent: 5.0
NIOSH (RTECS) Number: GU6300000
CAS Number: 110-82-7
OSHA PEL: 300 PPM
ACGIH TLV: 300 PPM, 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: METHYL TERT-BUTYL ETHER (SARA III)
Ingredient Sequence Number: 07
Percent: 15
NIOSH (RTECS) Number: KN5250000
CAS Number: 1634-04-4
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED
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Physical/Chemical Characteristics

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Appearance And Odor: LIQUID; COLOR NOT REPORTED; GASOLINE ODOR
Boiling Point: 80F-430F
Vapor Pressure (MM Hg/70 F): 7-15 LB RVP
Vapor Density (Air=1): 3-4
Specific Gravity: 0.75
Solubility In Water: NEGLIGIBLE (<0.1%)
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Fire and Explosion Hazard Data

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Flash Point: -45F, -43C
Lower Explosive Limit: 1.3
Upper Explosive Limit: 7.6
Extinguishing Media: AGENTS FOR CLASS B FIRE (EG. DRY CHEMICAL, CARBON DIOXIDE, HALOGENATED AGENTS, FOAM, STEAM), WATER FOG.
Special Fire Fighting Proc: HMIS SUGGESTS TO USE A SELF-CONTAINED BREATHING APPARATUS WHENEVER FIGHTING A CHEMICAL FIRE.
Unusual Fire And Expl Hazrds: FLASHBACK HAZARD-VAPORS ARE HEAVIER THAN AIR

AND TRAVEL ALONG THE GROUND;FLOWING GASOLINE GENERATES STATIC ELECTRICITY.

Reactivity Data

Stability: YES

Cond To Avoid (Stability): HIGH HEAT AND SOURCES OF IGNITION.

Materials To Avoid: CHLORINE,FLUORINE AND OTHER STRONG OXIDIZERS.

Hazardous Decomp Products: CARBON DIOXIDE,CARBON MONOXIDE.

Hazardous Poly Occur: NO

Conditions To Avoid (Poly): NONE

Health Hazard Data

LD50-LC50 Mixture: TLV(GASOLINE)=300PPM

Route Of Entry - Inhalation: YES

Route Of Entry - Skin: YES

Route Of Entry - Ingestion: NO

Health Haz Acute And Chronic: EYES:MAY CAUSE DISCOMFORT.SKIN:THE DEFATTING PROPERTY OF THIS ITEM MAY CAUSE IRRITATION OR DERMATITIS.INHAL:VAPORS ARE HARMFUL.INGEST:CAN CAUSE LUNG DAMAGE IF VOMITED AFTER SWALLOWING.

Carcinogenicity - NTP: YES

Carcinogenicity - IARC: YES

Carcinogenicity - OSHA: YES

Explanation Carcinogenicity: CONTAINS Benzene [71-43-2] WHICH IS LISTED BY NTP AND IARC AND REGULATED BY OSHA AS A CARCINOGEN.

Signs/Symptoms Of Overexp: INHAL:HEADACHE,DIZZINESS,DROWSINESS AND NAUSEA.

Med Cond Aggravated By Exp: NOT REPORTED.

Emergency/First Aid Proc: EYES:FLUSH WITH WATER;GET MEDICAL ATTENTION IF IRRITATION PERSISTS.SKIN:REMOVE CONTAMINATED CLOTHING;WASH WITH SOAP AND WATER;CALL PHYSICIAN IF IRRITATION PERSISTS.INHAL:REMOVE FROM EXPOSURE.GIVE ARTIFICIAL RESPIRATION IF NEEDED.CALL PHYSICIAN.INGEST:DO NOT INDUCE VOMITING.GET VICTIM TO LAY ON LEFT SIDE WITH HEAD DOWN IF VOMITING OCCURS. GET PROMPT QUALIFIED MEDICAL ATTENTION.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: REMOVE SOURCES OF IGNITION.VENTILATE;USE WATER SPRAY TO DISPERSE VAPORS.ADSORB ON A NON-FLAMMABLE MATERIEL(EG. DIATOMACEOUS EARTH,CLAY);PLACE IN AN APPROPRIATE CONTAINER FOR DISPOSAL.

Neutralizing Agent: NONE

Waste Disposal Method: WASTE IS RCRA HAZARD(IGNITABLE AND TOXIC).DISPOSE OF IN ACCORDANCE WITH FEDERAL,STATE AND LOCAL REGULATIONS.

Precautions-Handling/Storing: STORE IN FLAMMABLE LIQUID STORAGE AREA.KEEP CONTAINER CLOSED.

Other Precautions: KEEP OUT OF SEWERS AND WATERWAYS.USE ONLY AS A MOTOR FUEL.

Control Measures

Respiratory Protection: USE A SELF-CONTAINED BREATHING APPARATUS OR NIOSH ORGANIC MIST RESPIRATOR IN THE LACK OF ENVIROMENTAL CONTROLS OR IN ENCLOSED SPACES(ONLY USE SCBA).

Ventilation: ENVIRONMENTAL CONTROLS TO MAINTAIN EXPOSURE OF GASOLINE BELOW 300PPM.

Protective Gloves: NITRILE,VITON.

Eye Protection: SPLASH-PROOF TYPE.

Other Protective Equipment: CLOTHING TO PROTECT SKIN FROM LIQUID CONTACT.

Work Hygienic Practices: WASH HANDS.SEPERATE WORK CLOTHES FROM STREET CLOTHES.LAUNDER WORK CLOTHES BEFORE REUSE.KEEP FOOD OUT OF THE WORK AREA.

Suppl. Safety & Health Data: NONE

Transportation Data

Trans Data Review Date: 93204

DOT PSN Code: GTN
DOT Proper Shipping Name: GASOLINE
DOT Class: 3
DOT ID Number: UN1203
DOT Pack Group: II
DOT Label: FLAMMABLE LIQUID
IMO PSN Code: HRV
IMO Proper Shipping Name: GASOLINE
IMO Regulations Page Number: 3141
IMO UN Number: 1203
IMO UN Class: 3.1
IMO Subsidiary Risk Label: -
IATA PSN Code: RMF
IATA UN ID Number: 1203
IATA Proper Shipping Name: MOTOR SPIRIT
IATA UN Class: 3
IATA Label: FLAMMABLE LIQUID
AFI PSN Code: MUC
AFI Prop. Shipping Name: GASOLINE
AFI Class: 3
AFI ID Number: UN1203
AFI Pack Group: II
AFI Basic Pac Ref: 7-7
Additional Trans Data: NONE

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Disposal Data

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Label Data

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Label Required: YES
Technical Review Date: 23JUL93
MFR Label Number: UNKNOWN
Label Status: F
Common Name: REGULAR LEAD FREE GASOLINE
Signal Word: DANGER!
Acute Health Hazard-Moderate: X
Contact Hazard-Moderate: X
Fire Hazard-Severe: X
Reactivity Hazard-None: X
Special Hazard Precautions: EYES:MAY CAUSE DISCOMFORT.SKIN:THE DEFATTING
PROPERTY OF THIS ITEM MAY CAUSE IRRITATION OR DERMATITIS.INHAL:VAPORS ARE
HARMFUL.INGEST:CAN CAUSE LUNG DAMAGE IF VOMITED AFTER SWALLOWING. STORE IN
FLAMMABLE LIQUID STORAGE AREA.KEEP CONTAINER CLOSED. FIRST AID: EYES:FLUSH
WITH WATER;GET MEDICAL ATTENTION IF IRRITATION PERSISTS.SKIN:REMOVE
CONTAMINATED CLOTHING;WASH WITH SOAP AND WATER;CALL PHYSICIAN IF IRRITATION
PERSISTS.INHAL:REMOVE FROM EXPOSURE.GIVE ARTIFICIAL RESPIRATION IF NEEDED.
CALL PHYSICIAN.INGEST:DO NOT INDUCE VOMITING.GET VICTIM TO LAY ON LEFT SIDE
WITH HEAD DOWN IF VOMITING OCCURS.GET PROMPT QUALIFIED MEDICAL ATTENTION.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: AMOCO OIL COMPANY
Label Street: 200 EAST RANDOLPH DRIVE MC 1408
Label City: CHICAGO
Label State: IL
Label Zip Code: 60601-6401
Label Country: US
Label Emergency Number: 800-447-8735 800-424-9300

AMOCO OIL -- REGULAR LEAD FREE GASOLINE - GASOLINE, AUTOMOTIVE
MATERIAL SAFETY DATA SHEET
NSN: 9130001487102
Manufacturer's CAGE: 15958
Part No. Indicator: A
Part Number/Trade Name: REGULAR LEAD FREE GASOLINE
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General Information
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Item Name: GASOLINE, AUTOMOTIVE
Company's Name: AMOCO OIL COMPANY
Company's Street: 200 EAST RANDOLPH DRIVE MC 1408
Company's City: CHICAGO
Company's State: IL
Company's Country: US
Company's Zip Code: 60601-6401
Company's Emerg Ph #: 800-447-8735 800-424-9300
Company's Info Ph #: 312-856-3931
Record No. For Safety Entry: 021
Tot Safety Entries This Stk#: 053
Status: SE
Date MSDS Prepared: 14JAN91
Safety Data Review Date: 23JUL93
Supply Item Manager: KY
MSDS Preparer's Name: R.G. FARMER
MSDS Serial Number: BRFLJ
Specification Number: VV-G-1690
Spec Type, Grade, Class: CL A,B,C,D,E, GR SPL
Hazard Characteristic Code: F2
Unit Of Issue: GL
Unit Of Issue Container Qty: BULK
Type Of Container: BULK
Net Unit Weight: UNKNOWN
NRC/State License Number: NONE
Net Propellant Weight-Ammo: NONE
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Ingredients/Identity Information
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Proprietary: NO
Ingredient: GASOLINE
Ingredient Sequence Number: 01
Percent: UNKNOWN
NIOSH (RTECS) Number: LX3300000
CAS Number: 8006-61-9
OSHA PEL: 300 PPM/500 STEL
ACGIH TLV: 300 PPM/500 STEL; 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: BENZENE (SARA III)
Ingredient Sequence Number: 02
Percent: 4.0
NIOSH (RTECS) Number: CY1400000
CAS Number: 71-43-2
OSHA PEL: 1PPM/5STEL; 1910.1028
ACGIH TLV: 10 PPM; A2; 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: ETHYL BENZENE (SARA III)
Ingredient Sequence Number: 03
Percent: 2.0
NIOSH (RTECS) Number: DA0700000

CAS Number: 100-41-4
OSHA PEL: 100 PPM/125 STEL
ACGIH TLV: 100 PPM/125 STEL 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: TOLUENE (SARA III)
Ingredient Sequence Number: 04
Percent: 22.0
NIOSH (RTECS) Number: XS5250000
CAS Number: 108-88-3
OSHA PEL: 200 PPM/150 STEL
ACGIH TLV: 50 PPM; 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: XYLENES (O-,M-,P- ISOMERS) (SARA III)
Ingredient Sequence Number: 05
Percent: 10.0
NIOSH (RTECS) Number: ZE2100000
CAS Number: 1330-20-7
OSHA PEL: 100 PPM/150 STEL
ACGIH TLV: 100 PPM/150 STEL; 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: CYCLOHEXANE (SARA III)
Ingredient Sequence Number: 06
Percent: 5.0
NIOSH (RTECS) Number: GU6300000
CAS Number: 110-82-7
OSHA PEL: 300 PPM
ACGIH TLV: 300 PPM, 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: METHYL TERT-BUTYL ETHER (SARA III)
Ingredient Sequence Number: 07
Percent: 15
NIOSH (RTECS) Number: KN5250000
CAS Number: 1634-04-4
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED
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Physical/Chemical Characteristics

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Appearance And Odor: LIQUID; COLOR NOT REPORTED; GASOLINE ODOR
Boiling Point: 80F-430F
Vapor Pressure (MM Hg/70 F): 7-15LB RVP
Vapor Density (Air=1): 3-4
Specific Gravity: 0.75
Solubility In Water: NEGLIGIBLE (<0.1%)
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Fire and Explosion Hazard Data

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Flash Point: -45F, -43C
Lower Explosive Limit: 1.3
Upper Explosive Limit: 7.6
Extinguishing Media: AGENTS FOR CLASS B FIRE (EG. DRY CHEMICAL, CARBON DIOXIDE, HALOGENATED AGENTS, FOAM, STEAM), WATER FOG.
Special Fire Fighting Proc: HMIS SUGGESTS TO USE A SELF-CONTAINED BREATHING APPARATUS WHENEVER FIGHTING A CHEMICAL FIRE.
Unusual Fire And Expl Hazrds: FLASHBACK HAZARD-VAPORS ARE HEAVIER THAN AIR
=====

AND TRAVEL ALONG THE GROUND; FLOWING GASOLINE GENERATES STATIC ELECTRICITY.

Reactivity Data

Stability: YES

Cond To Avoid (Stability): HIGH HEAT AND SOURCES OF IGNITION.

Materials To Avoid: CHLORINE, FLUORINE AND OTHER STRONG OXIDIZERS.

Hazardous Decomp Products: CARBON DIOXIDE, CARBON MONOXIDE.

Hazardous Poly Occur: NO

Conditions To Avoid (Poly): NONE

Health Hazard Data

LD50-LC50 Mixture: TLV(GASOLINE)=300PPM

Route Of Entry - Inhalation: YES

Route Of Entry - Skin: YES

Route Of Entry - Ingestion: NO

Health Haz Acute And Chronic: EYES: MAY CAUSE DISCOMFORT. SKIN: THE DEFATTING PROPERTY OF THIS ITEM MAY CAUSE IRRITATION OR DERMATITIS. INHAL: VAPORS ARE HARMFUL. INGEST: CAN CAUSE LUNG DAMAGE IF VOMITED AFTER SWALLOWING.

Carcinogenicity - NTP: YES

Carcinogenicity - IARC: YES

Carcinogenicity - OSHA: YES

Explanation Carcinogenicity: CONTAINS Benzene [71-43-2] WHICH IS LISTED BY NTP AND IARC AND REGULATED BY OSHA AS A CARCINOGEN.

Signs/Symptoms Of Overexp: INHAL: HEADACHE, DIZZINESS, DROWSINESS AND NAUSEA.

Med Cond Aggravated By Exp: NOT REPORTED.

Emergency/First Aid Proc: EYES: FLUSH WITH WATER; GET MEDICAL ATTENTION IF IRRITATION PERSISTS. SKIN: REMOVE CONTAMINATED CLOTHING; WASH WITH SOAP AND WATER; CALL PHYSICIAN IF IRRITATION PERSISTS. INHAL: REMOVE FROM EXPOSURE. GIVE ARTIFICIAL RESPIRATION IF NEEDED. CALL PHYSICIAN. INGEST: DO NOT INDUCE VOMITING. GET VICTIM TO LAY ON LEFT SIDE WITH HEAD DOWN IF VOMITING OCCURS. GET PROMPT QUALIFIED MEDICAL ATTENTION.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: REMOVE SOURCES OF IGNITION. VENTILATE; USE WATER SPRAY TO DISPERSE VAPORS. ADSORB ON A NON-FLAMMABLE MATERIAL (EG. DIATOMACEOUS EARTH, CLAY); PLACE IN AN APPROPRIATE CONTAINER FOR DISPOSAL.

Neutralizing Agent: NONE

Waste Disposal Method: WASTE IS RCRA HAZARD (IGNITABLE AND TOXIC). DISPOSE OF IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS.

Precautions-Handling/Storing: STORE IN FLAMMABLE LIQUID STORAGE AREA. KEEP CONTAINER CLOSED.

Other Precautions: KEEP OUT OF SEWERS AND WATERWAYS. USE ONLY AS A MOTOR FUEL.

Control Measures

Respiratory Protection: USE A SELF-CONTAINED BREATHING APPARATUS OR NIOSH ORGANIC MIST RESPIRATOR IN THE LACK OF ENVIRONMENTAL CONTROLS OR IN ENCLOSED SPACES (ONLY USE SCBA).

Ventilation: ENVIRONMENTAL CONTROLS TO MAINTAIN EXPOSURE OF GASOLINE BELOW 300PPM.

Protective Gloves: NITRILE, VITON.

Eye Protection: SPLASH-PROOF TYPE.

Other Protective Equipment: CLOTHING TO PROTECT SKIN FROM LIQUID CONTACT.

Work Hygienic Practices: WASH HANDS. SEPARATE WORK CLOTHES FROM STREET CLOTHES. LAUNDRY WORK CLOTHES BEFORE REUSE. KEEP FOOD OUT OF THE WORK AREA.

Suppl. Safety & Health Data: NONE

Transportation Data

Trans Data Review Date: 93204

DOT PSN Code: GTN
DOT Proper Shipping Name: GASOLINE
DOT Class: 3
DOT ID Number: UN1203
DOT Pack Group: II
DOT Label: FLAMMABLE LIQUID
IMO PSN Code: HRV
IMO Proper Shipping Name: GASOLINE
IMO Regulations Page Number: 3141
IMO UN Number: 1203
IMO UN Class: 3.1
IMO Subsidiary Risk Label: -
IATA PSN Code: RMF
IATA UN ID Number: 1203
IATA Proper Shipping Name: MOTOR SPIRIT
IATA UN Class: 3
IATA Label: FLAMMABLE LIQUID
AFI PSN Code: MUC
AFI Prop. Shipping Name: GASOLINE
AFI Class: 3
AFI ID Number: UN1203
AFI Pack Group: II
AFI Basic Pac Ref: 7-7
Additional Trans Data: NONE

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Disposal Data

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Label Data

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Label Required: YES
Technical Review Date: 23JUL93
MFR Label Number: UNKNOWN
Label Status: F
Common Name: REGULAR LEAD FREE GASOLINE
Signal Word: DANGER!
Acute Health Hazard-Moderate: X
Contact Hazard-Moderate: X
Fire Hazard-Severe: X
Reactivity Hazard-None: X
Special Hazard Precautions: EYES:MAY CAUSE DISCOMFORT.SKIN:THE DEFATTING
PROPERTY OF THIS ITEM MAY CAUSE IRRITATION OR DERMATITIS.INHAL:VAPORS ARE
HARMFUL.INGEST:CAN CAUSE LUNG DAMAGE IF VOMITTED AFTER SWALLOWING. STORE IN
FLAMMABLE LIQUID STORAGE AREA.KEEP CONTAINER CLOSED. FIRST AID: EYES:FLUSH
WITH WATER;GET MEDICAL ATTENTION IF IRRITATION PERSISTS.SKIN:REMOVE
CONTAMINATED CLOTHING;WASH WITH SOAP AND WATER;CALL PHYSICIAN IF IRRITATION
PERSISTS.INHAL:REMOVE FROM EXPOSURE.GIVE ARTIFICIAL RESPIRATION IF NEEDED.
CALL PHYSICIAN.INGEST:DO NOT INDUCE VOMITING.GET VICTIM TO LAY ON LEFT SIDE
WITH HEAD DOWN IF VOMITING OCCURS.GET PROMPT QUALIFIED MEDICAL ATTENTION.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: AMOCO OIL COMPANY
Label Street: 200 EAST RANDOLPH DRIVE MC 1408
Label City: CHICAGO
Label State: IL
Label Zip Code: 60601-6401
Label Country: US
Label Emergency Number: 800-447-8735 800-424-9300

AMOCO OIL -- REGULAR LEAD FREE GASOLINE - GASOLINE,AUTOMOTIVE
MATERIAL SAFETY DATA SHEET
NSN: 9130001487102
Manufacturer's CAGE: 15958
Part No. Indicator: A
Part Number/Trade Name: REGULAR LEAD FREE GASOLINE
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General Information
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Item Name: GASOLINE,AUTOMOTIVE
Company's Name: AMOCO OIL COMPANY
Company's Street: 200 EAST RANDOLPH DRIVE MC 1408
Company's City: CHICAGO
Company's State: IL
Company's Country: US
Company's Zip Code: 60601-6401
Company's Emerg Ph #: 800-447-8735 800-424-9300
Company's Info Ph #: 312-856-3931
Record No. For Safety Entry: 021
Tot Safety Entries This Stk#: 053
Status: SE
Date MSDS Prepared: 14JAN91
Safety Data Review Date: 23JUL93
Supply Item Manager: KY
MSDS Preparer's Name: R.G. FARMER
MSDS Serial Number: BRFLJ
Specification Number: VV-G-1690
Spec Type, Grade, Class: CL A,B,C,D,E, GR SPL
Hazard Characteristic Code: F2
Unit Of Issue: GL
Unit Of Issue Container Qty: BULK
Type Of Container: BULK
Net Unit Weight: UNKNOWN
NRC/State License Number: NONE
Net Propellant Weight-Ammo: NONE
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Ingredients/Identity Information
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Proprietary: NO
Ingredient: GASOLINE
Ingredient Sequence Number: 01
Percent: UNKNOWN
NIOSH (RTECS) Number: LX3300000
CAS Number: 8006-61-9
OSHA PEL: 300 PPM/500 STEL
ACGIH TLV: 300 PPM/500STEL;9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: BENZENE (SARA III)
Ingredient Sequence Number: 02
Percent: 4.0
NIOSH (RTECS) Number: CY1400000
CAS Number: 71-43-2
OSHA PEL: 1PPM/5STEL;1910.1028
ACGIH TLV: 10 PPM; A2; 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: ETHYL BENZENE (SARA III)
Ingredient Sequence Number: 03
Percent: 2.0
NIOSH (RTECS) Number: DA0700000

CAS Number: 100-41-4
OSHA PEL: 100 PPM/125 STEL
ACGIH TLV: 100 PPM/125 STEL 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: TOLUENE (SARA III)
Ingredient Sequence Number: 04
Percent: 22.0
NIOSH (RTECS) Number: XS5250000
CAS Number: 108-88-3
OSHA PEL: 200 PPM/150 STEL
ACGIH TLV: 50 PPM; 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: XYLENES (O-,M-,P- ISOMERS) (SARA III)
Ingredient Sequence Number: 05
Percent: 10.0
NIOSH (RTECS) Number: ZE2100000
CAS Number: 1330-20-7
OSHA PEL: 100 PPM/150 STEL
ACGIH TLV: 100 PPM/150 STEL; 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: CYCLOHEXANE (SARA III)
Ingredient Sequence Number: 06
Percent: 5.0
NIOSH (RTECS) Number: GU6300000
CAS Number: 110-82-7
OSHA PEL: 300 PPM
ACGIH TLV: 300 PPM, 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: METHYL TERT-BUTYL ETHER (SARA III)
Ingredient Sequence Number: 07
Percent: 15
NIOSH (RTECS) Number: KN5250000
CAS Number: 1634-04-4
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

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Physical/Chemical Characteristics

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Appearance And Odor: LIQUID; COLOR NOT REPORTED; GASOLINE ODOR
Boiling Point: 80F-430F
Vapor Pressure (MM Hg/70 F): 7-15LB RVP
Vapor Density (Air=1): 3-4
Specific Gravity: 0.75
Solubility In Water: NEGLIGIBLE(<0.1%)

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Fire and Explosion Hazard Data

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Flash Point: -45F, -43C
Lower Explosive Limit: 1.3
Upper Explosive Limit: 7.6
Extinguishing Media: AGENTS FOR CLASS B FIRE (EG. DRY CHEMICAL, CARBON DIOXIDE, HALOGENATED AGENTS, FOAM, STEAM), WATER FOG.
Special Fire Fighting Proc: HMIS SUGGESTS TO USE A SELF-CONTAINED BREATHING APPARATUS WHENEVER FIGHTING A CHEMICAL FIRE.
Unusual Fire And Expl Hazrds: FLASHBACK HAZARD-VAPORS ARE HEAVIER THAN AIR

AND TRAVEL ALONG THE GROUND; FLOWING GASOLINE GENERATES STATIC ELECTRICITY.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): HIGH HEAT AND SOURCES OF IGNITION.
Materials To Avoid: CHLORINE, FLUORINE AND OTHER STRONG OXIDIZERS.
Hazardous Decomp Products: CARBON DIOXIDE, CARBON MONOXIDE.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NONE

Health Hazard Data

LD50-LC50 Mixture: TLV(GASOLINE)=300PPM
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: EYES: MAY CAUSE DISCOMFORT. SKIN: THE DEFATTING PROPERTY OF THIS ITEM MAY CAUSE IRRITATION OR DERMATITIS. INHAL: VAPORS ARE HARMFUL. INGEST: CAN CAUSE LUNG DAMAGE IF VOMITED AFTER SWALLOWING.
Carcinogenicity - NTP: YES
Carcinogenicity - IARC: YES
Carcinogenicity - OSHA: YES
Explanation Carcinogenicity: CONTAINS Benzene [71-43-2] WHICH IS LISTED BY NTP AND IARC AND REGULATED BY OSHA AS A CARCINOGEN.
Signs/Symptoms Of Overexp: INHAL: HEADACHE, DIZZINESS, DROWSINESS AND NAUSEA.
Med Cond Aggravated By Exp: NOT REPORTED.
Emergency/First Aid Proc: EYES: FLUSH WITH WATER; GET MEDICAL ATTENTION IF IRRITATION PERSISTS. SKIN: REMOVE CONTAMINATED CLOTHING; WASH WITH SOAP AND WATER; CALL PHYSICIAN IF IRRITATION PERSISTS. INHAL: REMOVE FROM EXPOSURE. GIVE ARTIFICIAL RESPIRATION IF NEEDED. CALL PHYSICIAN. INGEST: DO NOT INDUCE VOMITING. GET VICTIM TO LAY ON LEFT SIDE WITH HEAD DOWN IF VOMITING OCCURS. GET PROMPT QUALIFIED MEDICAL ATTENTION.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: REMOVE SOURCES OF IGNITION. VENTILATE; USE WATER SPRAY TO DISPERSE VAPORS. ADSORB ON A NON-FLAMMABLE MATERIAL (EG. DIATOMACEOUS EARTH, CLAY); PLACE IN AN APPROPRIATE CONTAINER FOR DISPOSAL.
Neutralizing Agent: NONE
Waste Disposal Method: WASTE IS RCRA HAZARD (IGNITABLE AND TOXIC). DISPOSE OF IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS.
Precautions-Handling/Storing: STORE IN FLAMMABLE LIQUID STORAGE AREA. KEEP CONTAINER CLOSED.
Other Precautions: KEEP OUT OF SEWERS AND WATERWAYS. USE ONLY AS A MOTOR FUEL.

Control Measures

Respiratory Protection: USE A SELF-CONTAINED BREATHING APPARATUS OR NIOSH ORGANIC MIST RESPIRATOR IN THE LACK OF ENVIRONMENTAL CONTROLS OR IN ENCLOSED SPACES (ONLY USE SCBA).
Ventilation: ENVIRONMENTAL CONTROLS TO MAINTAIN EXPOSURE OF GASOLINE BELOW 300PPM.
Protective Gloves: NITRILE, VITON.
Eye Protection: SPLASH-PROOF TYPE.
Other Protective Equipment: CLOTHING TO PROTECT SKIN FROM LIQUID CONTACT.
Work Hygienic Practices: WASH HANDS. SEPARATE WORK CLOTHES FROM STREET CLOTHES. LAUNDRY WORK CLOTHES BEFORE REUSE. KEEP FOOD OUT OF THE WORK AREA.
Suppl. Safety & Health Data: NONE

Transportation Data

Trans Data Review Date: 93204

DOT PSN Code: GTN
DOT Proper Shipping Name: GASOLINE
DOT Class: 3
DOT ID Number: UN1203
DOT Pack Group: II
DOT Label: FLAMMABLE LIQUID
IMO PSN Code: HRV
IMO Proper Shipping Name: GASOLINE
IMO Regulations Page Number: 3141
IMO UN Number: 1203
IMO UN Class: 3.1
IMO Subsidiary Risk Label: -
IATA PSN Code: RMF
IATA UN ID Number: 1203
IATA Proper Shipping Name: MOTOR SPIRIT
IATA UN Class: 3
IATA Label: FLAMMABLE LIQUID
AFI PSN Code: MUC
AFI Prop. Shipping Name: GASOLINE
AFI Class: 3
AFI ID Number: UN1203
AFI Pack Group: II
AFI Basic Pac Ref: 7-7
Additional Trans Data: NONE

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Disposal Data

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Label Data

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Label Required: YES
Technical Review Date: 23JUL93
MFR Label Number: UNKNOWN
Label Status: F
Common Name: REGULAR LEAD FREE GASOLINE
Signal Word: DANGER!
Acute Health Hazard-Moderate: X
Contact Hazard-Moderate: X
Fire Hazard-Severe: X
Reactivity Hazard-None: X
Special Hazard Precautions: EYES:MAY CAUSE DISCOMFORT.SKIN:THE DEFATTING
PROPERTY OF THIS ITEM MAY CAUSE IRRITATION OR DERMATITIS.INHAL:VAPORS ARE
HARMFUL.INGEST:CAN CAUSE LUNG DAMAGE IF VOMITTED AFTER SWALLOWING. STORE IN
FLAMMABLE LIQUID STORAGE AREA.KEEP CONTAINER CLOSED. FIRST AID: EYES:FLUSH
WITH WATER;GET MEDICAL ATTENTION IF IRRITATION PERSISTS.SKIN:REMOVE
CONTAMINATED CLOTHING;WASH WITH SOAP AND WATER;CALL PHYSICIAN IF IRRITATION
PERSISTS.INHAL:REMOVE FROM EXPOSURE.GIVE ARTIFICIAL RESPIRATION IF NEEDED.
CALL PHYSICIAN.INGEST:DO NOT INDUCE VOMITING.GET VICTIM TO LAY ON LEFT SIDE
WITH HEAD DOWN IF VOMITING OCCURS.GET PROMPT QUALIFIED MEDICAL ATTENTION.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: AMOCO OIL COMPANY
Label Street: 200 EAST RANDOLPH DRIVE MC 1408
Label City: CHICAGO
Label State: IL
Label Zip Code: 60601-6401
Label Country: US
Label Emergency Number: 800-447-8735 800-424-9300

AMOCO OIL -- 300 MOTOR OIL SAE 30--SG - LUBRICATING OIL,ENGINE
MATERIAL SAFETY DATA SHEET
NSN: 9150011004612
Manufacturer's CAGE: 15958
Part No. Indicator: A
Part Number/Trade Name: 300 MOTOR OIL SAE 30--SG

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General Information

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Item Name: LUBRICATING OIL,ENGINE
Company's Name: AMOCO OIL CO
Company's Street: 200 E RANDOLPH DR MC 1408
Company's City: CHICAGO
Company's State: IL
Company's Country: US
Company's Zip Code: 60601-6401
Company's Emerg Ph #: 800-447-8735/800-424-9300 CHEMTREC
Company's Info Ph #: 312-856-3907
Record No. For Safety Entry: 003
Tot Safety Entries This Stk#: 009
Status: SE
Date MSDS Prepared: 01NOV90
Safety Data Review Date: 08APR91
Supply Item Manager: CX
MSDS Preparer's Name: R. G. FARMER
MSDS Serial Number: BJRRM
Specification Number: MIL-L-2104
Spec Type, Grade, Class: GR 30
Hazard Characteristic Code: N1
Unit Of Issue: QT
Unit Of Issue Container Qty: 1 QUART
Type Of Container: CAN
Net Unit Weight: 1.9 LBS

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Ingredients/Identity Information

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Proprietary: NO
Ingredient: OILS
Ingredient Sequence Number: 01
Percent: 100
NIOSH (RTECS) Number: 1000107OI
OSHA PEL: 5 MG/M3 MIST
ACGIH TLV: 5 MG/M3 MIST
Other Recommended Limit: NONE SPECIFIED

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Physical/Chemical Characteristics

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Appearance And Odor: DARK RED OILY LIQUID
Melting Point: 0F,-18C
Specific Gravity: 0.89
Decomposition Temperature: UNKNOWN
Solubility In Water: NEGLIGIBLE
Corrosion Rate (IPY): UNKNOWN
Autoignition Temperature: 470F

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Fire and Explosion Hazard Data

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Flash Point: 424F,218C
Flash Point Method: COC
Extinguishing Media: USE WATER FOG, CARBON DIOXIDE, FOAM, DRY CHEMICAL,
EARTH OR SAND. WATER MAY CAUSE FROTHING
Special Fire Fighting Proc: WEAR FIRE FIGHTING PROTECTIVE EQUIPMENT AND A
FULL FACED SELF CONTAINED BREATHING APPARATUS. COOL FIRE EXPOSED CONTAINERS

WITH WATER SPRAY. CONTAIN RUNOFF.

Unusual Fire And Expl Hazrds: COMBUSTION OR HEAT OF FIRE MAY PRODUCE
HAZARDOUS DECOMPOSITION PRODUCTS AND VAPORS.

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Reactivity Data
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Stability: YES

Cond To Avoid (Stability): HIGH HEAT, OPEN FLAMES AND OTHER SOURCES OF
IGNITION

Materials To Avoid: STRONG OXIDIZING AGENTS

Hazardous Decomp Products: CARBON DIOXIDE, CARBON MONOXIDE, ALDEHYDES AND
KETONES, AND OTHER COMBUSTION PRODUCTS.

Hazardous Poly Occur: NO

Conditions To Avoid (Poly): NOT APPLICABLE
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Health Hazard Data
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LD50-LC50 Mixture: LD50 (ORAL RAT) IS ESTIMATED AT >10 G/KG

Route Of Entry - Inhalation: YES

Route Of Entry - Skin: YES

Route Of Entry - Ingestion: YES

Health Haz Acute And Chronic: EYES/SKIN: IRRITATION. AVOID BREATHING OF
MIST. PROLONGED OVEREXPOSURE MAY RESULT IN DERMATITIS AND RESPIRATORY
DIFFICULTIES. ANIMAL STUDIES ALSO SHOW AN EFFECT ON THE KIDNEYS FOR
EXPOSURE TO MATERIALS SIMILAR TO THIS. ABOVE TEMPERATURES OF 100F,
ASPIRATION INTO THE LUNGS IS A HAZARD.

Carcinogenicity - NTP: NO

Carcinogenicity - IARC: NO

Carcinogenicity - OSHA: NO

Explanation Carcinogenicity: NONE OF THE CHEMICALS IN THIS PRODUCT IS
LISTED BY IARC, NTP OR OSHA AS A CARCINOGEN.

Signs/Symptoms Of Overexp: IRRITATION OF EYES AND SKIN UPON CONTACT.

IRRITATION OF THE RESPIRATORY TRACT, HEADACHES, DIZZINESS, ANESTHETIC
EFFECT AND OTHER CENTRAL NERVOUS SYSTEM EFFECTS INCLUDING DEATH IN RARE
CASES.

Med Cond Aggravated By Exp: PERSONS WITH A HISTORY OF EYE, SKIN AND
RESPIRATORY DISORDERS MAY BE AT INCREASED RISK FROM EXPOSURE.

Emergency/First Aid Proc: EYE: IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR
15 MINUTES. GET MEDICAL ATTENTION. SKIN: WASH WITH SOAP AND WATER.

INHALATION: REMOVE TO FRESH AIR. IF BREATHING IS IRREGULAR OR HAS STOPPED,
START RESUSCITATION AND ADMINISTER OXYGEN. GET MEDICAL HELP IMMEDIATELY.

INGESTION: DO NOT INDUCE VOMITING. GET MEDICAL ATTENTION AT ONCE. IN CASE
OF SUBCUTANEOUS OR INTRAMUSCULAR INJECTION, SEEK HELP AT ONCE.
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Precautions for Safe Handling and Use
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Steps If Matl Released/Spill: WEAR PROTECTIVE EQUIPMENT, ELIMINATE SOURCES
OF IGNITION, AND VENTILATE AREA AS REQUIRED. RECOVER FREE LIQUID. ABSORB
SMALL SPILL WITH INERT MATERIAL. PLACE WASTE IN DOT APPROVED CONTAINER FOR
DISPOSAL. KEEP MATERIAL FROM WATERWAYS.

Neutralizing Agent: NONE

Waste Disposal Method: DISPOSE OF IN ACCORDANCE WITH ALL APPLICABLE
FEDERAL, STATE AND LOCAL REGULATIONS.

Precautions-Handling/Storing: STORE IN A COOL, DRY, WELL VENTILATED AREA
AWAY FROM SOURCES OF IGNITION. KEEP CONTAINER CLOSED WHEN NOT IN USE.
PROTECT FROM PHYSICAL DAMAGE.

Other Precautions: AVOID BREATHING OF MIST. MINIMIZE PERIODS OF EXPOSURE
TO HIGH TEMPERATURE. AVOID WATER CONTAMINATION. KEEP CONTAINER CLOSED.
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Control Measures
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Respiratory Protection: IF VENTILATION DOES NOT MAINTAIN INHALATION
EXPOSURES BELOW PEL (TLV), USE NIOSH/MSHA APPROVED RESPIRATOR AS PER
CURRENT 29 CFR 1910.134, INSTRUCTIONS/WARNINGS AND NIOSH-RESPIRATOR

SELECTION.

Ventilation: MECHANICAL (GENERAL) VENTILATION IS USUALLY ADEQUATE.

Protective Gloves: RUBBER GLOVES OR OTHER OIL RESISTANT.

Eye Protection: SAFETY GLASSES/CHEMICAL SPLASH GOGGLES

Other Protective Equipment: SAFETY SHOWER AND EYE BATH. INDUSTRIAL TYPE WORK CLOTHING AND APRON AS REQUIRED TO AVOID PROLONGED OR REPEATED CONTACT. Work Hygienic Practices: WASH THOROUGHLY AFTER HANDLING AND BEFORE EATING OR DRINKING. LAUNDRY CONTAMINATED CLOTHING BEFORE REUSE.

Suppl. Safety & Health Data: USE AIR-SUPPLIED RESPIRATORY EQUIPMENT IF EXPOSED TO HOT FUMES. TREAT EMPTY CONTAINERS AS DANGEROUS; DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE CONTAINERS TO HEAT, FLAME, SPARKS, PILOT LIGHTS, STATIC ELECTRICITY. RESIDUE MAY BE DIFFICULT TO REMOVE.

Transportation Data

Trans Data Review Date: 91098

DOT PSN Code: ZZZ

DOT Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION

IMO PSN Code: ZZZ

IMO Proper Shipping Name: NOT REGULATED FOR THIS MODE OF TRANSPORTATION

IATA PSN Code: ZZZ

IATA Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION

AFI PSN Code: ZZZ

AFI Prop. Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION

Disposal Data

Label Data

Label Required: YES

Technical Review Date: 08APR91

Label Status: G

Common Name: 300 MOTOR OIL SAE 30--SG

Chronic Hazard: NO

Signal Word: CAUTION!

Acute Health Hazard-Slight: X

Contact Hazard-Slight: X

Fire Hazard-Slight: X

Reactivity Hazard-None: X

Special Hazard Precautions: EYES/SKIN: IRRITATION. AVOID BREATHING OF MIST. PROLONGED OVEREXPOSURE MAY RESULT IN DERMATITIS AND RESPIRATORY DIFFICULTIES. ANIMAL STUDIES ALSO SHOW AN EFFECT ON THE KIDNEYS FOR EXPOSURE TO MATERIALS SIMILAR TO THIS. ABOVE TEMPERATURES OF 100F, ASPIRATION INTO THE LUNGS IS A HAZARD. STORE IN A COOL, DRY, WELL VENTILATED AREA AWAY FROM SOURCES OF IGNITION. KEEP CONTAINER CLOSED WHEN NOT IN USE. PROTECT FROM PHYSICAL DAMAGE. FIRST AID: EYE: IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR 15 MINUTES. GET MEDICAL ATTENTION. SKIN: WASH WITH SOAP AND WATER. INHALATION: REMOVE TO FRESH AIR. IF BREATHING IS IRREGULAR OR HAS STOPPED, START RESUSCITATION

Protect Eye: Y

Protect Skin: Y

Protect Respiratory: Y

Label Name: AMOCO OIL CO

Label Street: 200 E RANDOLPH DR MC 1408

Label City: CHICAGO

Label State: IL

Label Zip Code: 60601-6401

Label Country: US

Label Emergency Number: 800-447-8735/800-424-9300 CHEMTREC

AMOCO OIL -- 300 MOTOR OIL SAE 30--SG - LUBRICATING OIL,ENGINE
MATERIAL SAFETY DATA SHEET
NSN: 9150011004612
Manufacturer's CAGE: 15958
Part No. Indicator: A
Part Number/Trade Name: 300 MOTOR OIL SAE 30--SG

General Information

Item Name: LUBRICATING OIL,ENGINE
Company's Name: AMOCO OIL CO
Company's Street: 200 E RANDOLPH DR MC 1408
Company's City: CHICAGO
Company's State: IL
Company's Country: US
Company's Zip Code: 60601-6401
Company's Emerg Ph #: 800-447-8735/800-424-9300 CHEMTREC
Company's Info Ph #: 312-856-3907
Record No. For Safety Entry: 003
Tot Safety Entries This Stk#: 009
Status: SE
Date MSDS Prepared: 01NOV90
Safety Data Review Date: 08APR91
Supply Item Manager: CX
MSDS Preparer's Name: R. G. FARMER
MSDS Serial Number: BJRRM
Specification Number: MIL-L-2104
Spec Type, Grade, Class: GR 30
Hazard Characteristic Code: N1
Unit Of Issue: QT
Unit Of Issue Container Qty: 1 QUART
Type Of Container: CAN
Net Unit Weight: 1.9 LBS

Ingredients/Identity Information

Proprietary: NO
Ingredient: OILS
Ingredient Sequence Number: 01
Percent: 100
NIOSH (RTECS) Number: 10001070I
OSHA PEL: 5 MG/M3 MIST
ACGIH TLV: 5 MG/M3 MIST
Other Recommended Limit: NONE SPECIFIED

Physical/Chemical Characteristics

Appearance And Odor: DARK RED OILY LIQUID
Melting Point: 0F, -18C
Specific Gravity: 0.89
Decomposition Temperature: UNKNOWN
Solubility In Water: NEGLIGIBLE
Corrosion Rate (IPY): UNKNOWN
Autoignition Temperature: 470F

Fire and Explosion Hazard Data

Flash Point: 424F, 218C
Flash Point Method: COC
Extinguishing Media: USE WATER FOG, CARBON DIOXIDE, FOAM, DRY CHEMICAL,
EARTH OR SAND. WATER MAY CAUSE FROTHING
Special Fire Fighting Proc: WEAR FIRE FIGHTING PROTECTIVE EQUIPMENT AND A
FULL FACED SELF CONTAINED BREATHING APPARATUS. COOL FIRE EXPOSED CONTAINERS

WITH WATER SPRAY. CONTAIN RUNOFF.

Unusual Fire And Expl Hazrds: COMBUSTION OR HEAT OF FIRE MAY PRODUCE
HAZARDOUS DECOMPOSITION PRODUCTS AND VAPORS.

=====

Reactivity Data

=====

Stability: YES

Cond To Avoid (Stability): HIGH HEAT, OPEN FLAMES AND OTHER SOURCES OF
IGNITION

Materials To Avoid: STRONG OXIDIZING AGENTS

Hazardous Decomp Products: CARBON DIOXIDE, CARBON MONOXIDE, ALDEHYDES AND
KETONES, AND OTHER COMBUSTION PRODUCTS.

Hazardous Poly Occur: NO

Conditions To Avoid (Poly): NOT APPLICABLE

=====

Health Hazard Data

=====

LD50-LC50 Mixture: LD50 (ORAL RAT) IS ESTIMATED AT >10 G/KG

Route Of Entry - Inhalation: YES

Route Of Entry - Skin: YES

Route Of Entry - Ingestion: YES

Health Haz Acute And Chronic: EYES/SKIN: IRRITATION. AVOID BREATHING OF
MIST. PROLONGED OVEREXPOSURE MAY RESULT IN DERMATITIS AND RESPIRATORY
DIFFICULTIES. ANIMAL STUDIES ALSO SHOW AN EFFECT ON THE KIDNEYS FOR
EXPOSURE TO MATERIALS SIMILAR TO THIS. ABOVE TEMPERATURES OF 100F,
ASPIRATION INTO THE LUNGS IS A HAZARD.

Carcinogenicity - NTP: NO

Carcinogenicity - IARC: NO

Carcinogenicity - OSHA: NO

Explanation Carcinogenicity: NONE OF THE CHEMICALS IN THIS PRODUCT IS
LISTED BY IARC, NTP OR OSHA AS A CARCINOGEN.

Signs/Symptoms Of Overexp: IRRITATION OF EYES AND SKIN UPON CONTACT.

IRRITATION OF THE RESPIRATORY TRACT, HEADACHES, DIZZINESS, ANESTHETIC
EFFECT AND OTHER CENTRAL NERVOUS SYSTEM EFFECTS INCLUDING DEATH IN RARE
CASES.

Med Cond Aggravated By Exp: PERSONS WITH A HISTORY OF EYE, SKIN AND
RESPIRATORY DISORDERS MAY BE AT INCREASED RISK FROM EXPOSURE.

Emergency/First Aid Proc: EYE: IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR
15 MINUTES. GET MEDICAL ATTENTION. SKIN: WASH WITH SOAP AND WATER.

INHALATION: REMOVE TO FRESH AIR. IF BREATHING IS IRREGULAR OR HAS STOPPED,
START RESUSCITATION AND ADMINISTER OXYGEN. GET MEDICAL HELP IMMEDIATELY.

INGESTION: DO NOT INDUCE VOMITING. GET MEDICAL ATTENTION AT ONCE. IN CASE
OF SUBCUTANEOUS OR INTRAMUSCULAR INJECTION, SEEK HELP AT ONCE.

=====

Precautions for Safe Handling and Use

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Steps If Matl Released/Spill: WEAR PROTECTIVE EQUIPMENT, ELIMINATE SOURCES
OF IGNITION, AND VENTILATE AREA AS REQUIRED. RECOVER FREE LIQUID. ABSORB
SMALL SPILL WITH INERT MATERIAL. PLACE WASTE IN DOT APPROVED CONTAINER FOR
DISPOSAL. KEEP MATERIAL FROM WATERWAYS.

Neutralizing Agent: NONE

Waste Disposal Method: DISPOSE OF IN ACCORDANCE WITH ALL APPLICABLE
FEDERAL, STATE AND LOCAL REGULATIONS.

Precautions-Handling/Storing: STORE IN A COOL, DRY, WELL VENTILATED AREA
AWAY FROM SOURCES OF IGNITION. KEEP CONTAINER CLOSED WHEN NOT IN USE.

PROTECT FROM PHYSICAL DAMAGE.

Other Precautions: AVOID BREATHING OF MIST. MINIMIZE PERIODS OF EXPOSURE
TO HIGH TEMPERATURE. AVOID WATER CONTAMINATION. KEEP CONTAINER CLOSED.

=====

Control Measures

=====

Respiratory Protection: IF VENTILATION DOES NOT MAINTAIN INHALATION
EXPOSURES BELOW PEL (TLV), USE NIOSH/MSHA APPROVED RESPIRATOR AS PER
CURRENT 29 CFR 1910.134, INSTRUCTIONS/WARNINGS AND NIOSH-RESPIRATOR

SELECTION.

Ventilation: MECHANICAL (GENERAL) VENTILATION IS USUALLY ADEQUATE.

Protective Gloves: RUBBER GLOVES OR OTHER OIL RESISTANT.

Eye Protection: SAFETY GLASSES/CHEMICAL SPLASH GOGGLES

Other Protective Equipment: SAFETY SHOWER AND EYE BATH. INDUSTRIAL TYPE WORK CLOTHING AND APRON AS REQUIRED TO AVOID PROLONGED OR REPEATED CONTACT.

Work Hygienic Practices: WASH THOROUGHLY AFTER HANDLING AND BEFORE EATING OR DRINKING. LAUNDRY CONTAMINATED CLOTHING BEFORE REUSE.

Suppl. Safety & Health Data: USE AIR-SUPPLIED RESPIRATORY EQUIPMENT IF EXPOSED TO HOT FUMES. TREAT EMPTY CONTAINERS AS DANGEROUS; DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE CONTAINERS TO HEAT, FLAME, SPARKS, PILOT LIGHTS, STATIC ELECTRICITY. RESIDUE MAY BE DIFFICULT TO REMOVE.

=====

Transportation Data

=====

Trans Data Review Date: 91098

DOT PSN Code: ZZZ

DOT Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION

IMO PSN Code: ZZZ

IMO Proper Shipping Name: NOT REGULATED FOR THIS MODE OF TRANSPORTATION

IATA PSN Code: ZZZ

IATA Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION

AFI PSN Code: ZZZ

AFI Prop. Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION

=====

Disposal Data

=====

Label Data

=====

Label Required: YES

Technical Review Date: 08APR91

Label Status: G

Common Name: 300 MOTOR OIL SAE 30--SG

Chronic Hazard: NO

Signal Word: CAUTION!

Acute Health Hazard-Slight: X

Contact Hazard-Slight: X

Fire Hazard-Slight: X

Reactivity Hazard-None: X

Special Hazard Precautions: EYES/SKIN: IRRITATION. AVOID BREATHING OF MIST. PROLONGED OVEREXPOSURE MAY RESULT IN DERMATITIS AND RESPIRATORY DIFFICULTIES. ANIMAL STUDIES ALSO SHOW AN EFFECT ON THE KIDNEYS FOR EXPOSURE TO MATERIALS SIMILAR TO THIS. ABOVE TEMPERATURES OF 100F, ASPIRATION INTO THE LUNGS IS A HAZARD. STORE IN A COOL, DRY, WELL VENTILATED AREA AWAY FROM SOURCES OF IGNITION. KEEP CONTAINER CLOSED WHEN NOT IN USE. PROTECT FROM PHYSICAL DAMAGE. FIRST AID: EYE: IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR 15 MINUTES. GET MEDICAL ATTENTION. SKIN: WASH WITH SOAP AND WATER. INHALATION: REMOVE TO FRESH AIR. IF BREATHING IS IRREGULAR OR HAS STOPPED, START RESUSCITATION

Protect Eye: Y

Protect Skin: Y

Protect Respiratory: Y

Label Name: AMOCO OIL CO

Label Street: 200 E RANDOLPH DR MC 1408

Label City: CHICAGO

Label State: IL

Label Zip Code: 60601-6401

Label Country: US

Label Emergency Number: 800-447-8735/800-424-9300 CHEMTREC

MATERIAL SAFETY DATA SHEET



BENZENE (AMOCO/TOTAL)

MSDS No. 11697000 ANSI/ENGLISH

1.0 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: BENZENE (AMOCO/TOTAL)**MANUFACTURER/SUPPLIER:**

Amoco Oil Company
200 East Randolph Drive
Chicago, Illinois 60601 U.S.A.

EMERGENCY HEALTH INFORMATION:

1 (800) 447-8735

EMERGENCY SPILL INFORMATION:

1 (800) 424-9300 CHEMTREC (USA)

**OTHER PRODUCT SAFETY
INFORMATION:**(312) 856-3907

2.0 COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS#	Range % by Wt.
Benzene	71-43-2	99.80
Toluene	108-88-3	0.20

(See Section 8.0, "Exposure Controls/Personal Protection", for exposure guidelines)

3.0 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Danger! Extremely flammable. Causes eye and skin irritation. Inhalation causes headaches, dizziness, drowsiness, and nausea, and may lead to unconsciousness. Harmful or fatal if liquid is aspirated into lungs. Danger! Contains Benzene. Cancer hazard. Can cause blood disorders. Harmful when absorbed through the skin.

POTENTIAL HEALTH EFFECTS:

EYE CONTACT: Causes mild eye irritation.

SKIN CONTACT: Causes mild skin irritation. Causes skin irritation on prolonged or repeated

contact. Harmful when absorbed through the skin.

INHALATION: Cancer hazard. Can cause blood disorders. Inhalation causes headaches, dizziness, drowsiness, and nausea, and may lead to unconsciousness. See "Toxicological Information" section (Section 11.0).

INGESTION: Harmful or fatal if liquid is aspirated into lungs. See "Toxicological Information" section (Section 11.0).

HMIS CODE: (Health:2) (Flammability:3) (Reactivity:0)

NFPA CODE: (Health:2) (Flammability:3) (Reactivity:0)

4.0 FIRST AID MEASURES

EYE: Flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation persists.

SKIN: Wash exposed skin with soap and water. Remove contaminated clothing, including shoes, and thoroughly clean and dry before reuse. Get medical attention if irritation develops.

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

INGESTION: If swallowed, drink plenty of water, do NOT induce vomiting. Get immediate medical attention.

5.0 FIRE FIGHTING MEASURES

FLASHPOINT: 12°F(-11°C)

UEL: 8.0%

LEL: 1.5%

AUTOIGNITION TEMPERATURE: 928°F (498°C)

FLAMMABILITY CLASSIFICATION: Extremely Flammable Liquid.

EXTINGUISHING MEDIA: Agents approved for Class B hazards (e.g., dry chemical, carbon dioxide, foam, steam) or water fog.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Extremely flammable liquid. Vapor may explode if ignited in enclosed area.

FIRE-FIGHTING EQUIPMENT: Firefighters should wear full bunker gear, including a positive pressure self-contained breathing apparatus.

PRECAUTIONS: Keep away from sources of ignition (e.g., heat and open flames). Keep container closed. Use with adequate ventilation.

HAZARDOUS COMBUSTION PRODUCTS: Incomplete burning can produce carbon monoxide and/or carbon dioxide and other harmful products.

6.0 ACCIDENTAL RELEASE MEASURES

Remove or shut off all sources of ignition. Remove mechanically or contain on an absorbent material such as dry sand or earth. Increase ventilation if possible. Wear respirator and spray with water to disperse vapors. Keep out of sewers and waterways.

7.0 HANDLING AND STORAGE

HANDLING: Use with adequate ventilation. Do not breathe vapors. Keep away from ignition sources (e.g., heat, sparks, or open flames). Ground and bond containers when transferring materials. Wash thoroughly after handling. After this container has been emptied, it may contain flammable vapors; observe all warnings and precautions listed for this product.

STORAGE: Store in flammable liquids storage area. Store away from heat, ignition sources, and open flame in accordance with applicable regulations. Keep container closed. Outside storage is recommended.

8.0 EXPOSURE CONTROLS / PERSONAL PROTECTION

EYE: Do not get in eyes. Wear eye protection.

SKIN: Do not get on skin or clothing. Wear protective clothing and gloves.

INHALATION: Do not breathe mist or vapor. If heated and ventilation is inadequate, use supplied-air respirator approved by NIOSH/MSHA.

ENGINEERING CONTROLS: Control airborne concentrations below the exposure guidelines.

EXPOSURE GUIDELINES:

Component	CAS#	Exposure Limits
Benzene	71-43-2	OSHA PEL: 1 ppm OSHA STEL: 5 ppm ACGIH TLV-TWA: 10 ppm
Toluene	108-88-3	OSHA PEL: 100 ppm (1989); 200 ppm (1971) OSHA STEL: 150 ppm (1989); Not established. (1971) OSHA Ceiling: 300 ppm (1971) ACGIH TLV-TWA: 50 ppm (skin)

9.0 CHEMICAL AND PHYSICAL PROPERTIES

APPEARANCE AND ODOR: Liquid. Colorless. Sweet odor.

pH: Not determined.

VAPOR PRESSURE: 74.6 mm Hg at 20 °C

VAPOR DENSITY: Not determined.

BOILING POINT: 176°F(80°C)

MELTING POINT: 42°F(6°C)

SOLUBILITY IN WATER: Slight, 0.1 to 1.0%.

SPECIFIC GRAVITY (WATER=1): 0.88

10.0 STABILITY AND REACTIVITY

STABILITY: Stable.

CONDITIONS TO AVOID: Keep away from ignition sources (e.g. heat, sparks, and open flames).

MATERIALS TO AVOID: Avoid chlorine, fluorine, and other strong oxidizers.

HAZARDOUS DECOMPOSITION: None identified.

HAZARDOUS POLYMERIZATION: Will not occur.

11.0 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY DATA:

EYE IRRITATION: Testing not conducted. See Other Toxicity Data.

SKIN IRRITATION: Testing not conducted. See Other Toxicity Data.

DERMAL LD50: Testing not conducted. See Other Toxicity Data.

ORAL LD50: 3.8 g/kg (rat).

INHALATION LC50: 10000 ppm (rat)

OTHER TOXICITY DATA: Acute toxicity of benzene results primarily from depression of the central nervous system (CNS). Inhalation of concentrations over 50 ppm can produce headache, lassitude, weariness, dizziness, drowsiness, or excitation. Exposure to very high levels can result in unconsciousness and death.

Long-term overexposure to benzene has been associated with certain types of leukemia in humans. In addition, the International Agency for Research on Cancer (IARC) and OSHA consider benzene to be a human carcinogen. Chronic exposures to benzene at levels of 100 ppm and below have been reported to cause adverse blood effects including anemia. Benzene exposure can occur by inhalation and absorption through the skin.

Inhalation and forced feeding studies of benzene in laboratory animals have produced a carcinogenic response in a variety of organs, including possibly leukemia, other adverse effects on the blood, chromosomal changes and some effects on the immune system. Exposure to benzene at levels up to 300 ppm did not produce birth defects in animal studies; however, exposure to the higher dosage levels (greater than 100 ppm) resulted in a reduction of body weight of the rat pups (fetotoxicity). Changes in the testes have been observed in mice exposed to benzene at 300 ppm, but reproductive performance was not altered in rats exposed to benzene at the same level.

Aspiration of this product into the lungs can cause chemical pneumonia and can be fatal. Aspiration into the lungs can occur while vomiting after ingestion of this product. Do not siphon by mouth.

12.0 ECOLOGICAL INFORMATION

Ecological testing has not been conducted on this product.

13.0 DISPOSAL INFORMATION

Disposal must be in accordance with applicable federal, state, or local regulations. Enclosed-controlled incineration is recommended unless directed otherwise by applicable ordinances. Residues and spilled material are hazardous waste due to ignitability.

14.0 TRANSPORTATION INFORMATION

U.S. DEPT OF TRANSPORTATION

Shipping Name	Benzene
Hazard Class	3
Identification Number	UN1114
Packing Group	II
RQ	RQ

INTERNATIONAL INFORMATION:

Sea (IMO/IMDG)

Shipping Name Not determined.

Air (ICAO/IATA)

Shipping Name Not determined.

European Road/Rail (ADR/RID)

Shipping Name Not determined.

Canadian Transportation of Dangerous Goods

Shipping Name Not determined.

15.0 REGULATORY INFORMATION

CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR Part 302.4): This product is reportable under 40 CFR Part 302.4 because it contains the following substance(s):

Component/CAS Number	Weight %	Component Reportable Quantity (RQ)
Benzene 71-43-2	99.80	10 lbs.

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR Part 355): This product is not regulated under Section 302 of SARA and 40 CFR Part 355.

SARA TITLE III SECTIONS 311/312 HAZARDOUS CATEGORIZATION (40 CFR Part 370): This product is defined as hazardous by OSHA under 29 CFR Part 1910.1200(d).

SARA TITLE III SECTION 313 (40 CFR Part 372): This product contains the following substance(s), which is on the Toxic Chemicals List in 40 CFR Part 372:

Component/CAS Number	Weight Percent
Benzene 71-43-2	99.80

U.S. INVENTORY (TSCA): Listed on inventory.

OSHA HAZARD COMMUNICATION STANDARD: Flammable liquid. Carcinogen. Irritant. CNS Effects. Target organ effects.

EC INVENTORY (EINECS/ELINCS): In compliance.

JAPAN INVENTORY (MITI): Not determined.

AUSTRALIA INVENTORY (AICS): Not determined.

KOREA INVENTORY (ECL): Not determined.

CANADA INVENTORY (DSL): Not determined.

PHILIPPINE INVENTORY (PICCS): Not determined.

16.0 OTHER INFORMATION

Prepared by:

Environment, Health and Safety Department

Issued: November 14, 1995

This material Safety Data Sheet conforms to the requirements of ANSI Z400.1.

This material safety data sheet and the information it contains is offered to you in good faith as accurate. We have reviewed any information contained in this data sheet which we received from sources outside our company. We believe that information to be correct but cannot guarantee its accuracy or completeness. Health and safety precautions in this data sheet may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as a permission or recommendation for the use of any product in a manner that might infringe existing patents. No warranty is made, either express or implied.

Please reduce your browser font size for better viewing and printing.

MSDS

Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865



24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response In Canada
CANUTEC: 613-896-6566

Outside U.S. and Canada
Chemtec: 202-483-7616

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

Chromium Oxide

MSDS Number: C4356 --- Effective Date: 03/01/00

1. Product Identification

Synonyms: Chromium (III) Oxide; Chromic Oxide; Chrome Oxide Green
CAS No.: 1308-38-9
Molecular Weight: 151.99
Chemical Formula: Cr₂O₃
Product Codes: 1616, 1617

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Chromium (III) Oxide	1308-38-9	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

J.T. Baker SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate

Flammability Rating: 0 - None

Reactivity Rating: 1 - Slight

Contact Rating: 2 - Moderate

Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES

Storage Color Code: Blue (Health)

Potential Health Effects

Inhalation:

Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath.

Ingestion:

Causes irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea.

Skin Contact:

Causes irritation to skin. Symptoms include redness, itching, and pain.

Eye Contact:

Causes irritation, redness, and pain.

Chronic Exposure:

Prolonged or repeated skin contact may produce severe irritation or dermatitis.

Aggravation of Pre-existing Conditions:

No information found.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion:

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

Skin Contact:

Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:

Not considered to be a fire hazard.

Explosion:

Not considered to be an explosion hazard.

Fire Extinguishing Media:

Use any means suitable for extinguishing surrounding fire.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Pick up and place in a suitable container for reclamation or disposal in a method that does not generate dust. Do not sweep. Damp mop any residue.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Do not store on wooden floors. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

-OSHA Permissible Exposure Limit (PEL):
for Cr(III) compounds = 0.5mg/m³ (TWA)

-ACGIH Threshold Limit Value (TLV):
for Cr(III) compounds = 0.5 mg/m³ (TWA), A4 - Not classifiable as a human carcinogen

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded, a half-face dust/mist respirator may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece dust/mist respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator.

WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

Light to dark green Crystalline solid.

Odor:

Odorless.

Solubility:

Negligible (< 0.1%)

Specific Gravity:

5.10

pH:

No information found.

% Volatiles by volume @ 21C (70F):

0

Boiling Point:

4000C (7232F)

Melting Point:

2435C (4415F)

Vapor Density (Air=1):

Not applicable.

Vapor Pressure (mm Hg):

Not applicable.

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:

No information found.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Lithium, glycerol.

Conditions to Avoid:

Dusting.

11. Toxicological Information

Investigated as a tumorigen, mutagen.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Chromium (III) Oxide (1308-38-9)	No	No	3

12. Ecological Information

Environmental Fate:

When released into the soil, this material is not expected to biodegrade. This material is not expected to significantly bioaccumulate.

Environmental Toxicity:

No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----
Ingredient TSCA EC Japan Australia

Chromium (III) Oxide (1308-38-9) Yes Yes Yes Yes

-----\Chemical Inventory Status - Part 2\-----
Ingredient Korea --Canada-- DSL NDSL Phil.

Chromium (III) Oxide (1308-38-9) Yes Yes No Yes

-----\Federal, State & International Regulations - Part 1\-----
-SARA 302- -SARA 313-
Ingredient RQ TPQ List Chemical Catg.

Chromium (III) Oxide (1308-38-9) No No No Chromium com

-----\Federal, State & International Regulations - Part 2\-----
Ingredient CERCLA -RCRA- -TSCA-
----- 261.33 8(d)

Chromium (III) Oxide (1308-38-9) No No No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Pure / Solid)

Australian Hazchem Code: No information found.

Poison Schedule: No information found.

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

Label Hazard Warning:

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

Label Precautions:

Avoid contact with eyes, skin and clothing.

Wash thoroughly after handling.

Avoid breathing dust.

Keep container closed.

Use only with adequate ventilation.

Label First Aid:

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, wipe off excess material from skin then immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.

Product Use:

Laboratory Reagent.

Revision Information:

No changes.

Disclaimer:

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Prepared by: Strategic Services Division

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POLY AROMATIC HYDROCARBONS

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ULTRA SCIENTIFIC -- US-106N, POLYNUCLEAR AROMATIC HYDROCARBONS (SUPDAT)

ULTRA SCIENTIFIC -- US-106NS, POLYNUCLEAR AROMATIC HYDROCARBONS

ULTRA SCIENTIFIC -- US-116 POLYNUCLEAR AROMATIC HYDROCARBONS MIXTURE

Found 3 items.

ALDRICH CHEMICAL -- BENZO (A) PYRENE, 98%, B1008-0
MATERIAL SAFETY DATA SHEET
NSN: 681000N065303
Manufacturer's CAGE: 60928
Part No. Indicator: A
Part Number/Trade Name: BENZO (A) PYRENE, 98%, B1008-0

=====
General Information
=====

Company's Name: ALDRICH CHEMICAL CO INC
Company's P. O. Box: 355
Company's City: MILWAUKEE
Company's State: WI
Company's Country: US
Company's Zip Code: 53201
Company's Emerg Ph #: 414-273-3850
Company's Info Ph #: 414-273-3850
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SMJ
Date MSDS Prepared: 05JAN95
Safety Data Review Date: 23OCT95
MSDS Serial Number: BZRGR

=====
Ingredients/Identity Information
=====

Proprietary: NO
Ingredient: BENZO(A)PYRENE (CERCLA)
Ingredient Sequence Number: 01
Percent: 98
NIOSH (RTECS) Number: DJ3675000
CAS Number: 50-32-8
OSHA PEL: 0.2 MG/M3
ACGIH TLV: A2

=====
Physical/Chemical Characteristics
=====

Appearance And Odor: YELLOW GREEN POWDER.
Boiling Point: 923F, 495C
Melting Point: >351F, >177C

=====
Fire and Explosion Hazard Data
=====

Extinguishing Media: WATER SPRAY, CARBON DIOXIDE, DRY CHEMICAL POWDER OR
APPROPRIATE FOAM.
Special Fire Fighting Proc: WEAR NIOSH/MSHA APPROVED SCBA & FULL
PROTECTIVE EQUIPMENT (FP N).
Unusual Fire And Expl Hazrds: NONE SPECIFIED BY MANUFACTURER.

=====
Reactivity Data
=====

Stability: YES
Cond To Avoid (Stability): NONE SPECIFIED BY MANUFACTURER.
Materials To Avoid: OXIDIZING AGENTS.
Hazardous Decomp Products: CARBON MONOXIDE, CARBON DIOXIDE.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT

=====
Health Hazard Data
=====

LD50-LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES

Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: ACUTE:HARMFUL IF SWALLOWED, INHALED OR
ABSORBED THROUGH SKIN. MAY CAUSE EYE IRRITATION. MAY CAUSE SKIN IRRITATION.
SKIN LUNGS. TO THE BEST OF MANUFACTURER'S KNOWLEDGE, THE CHEMICAL, PHYSICAL
& TOX PROPERTIES HAVE NOT BEEN THORO INVESTIGATED.

Carcinogenicity - NTP: YES

Carcinogenicity - IARC: YES

Carcinogenicity - OSHA: NO

Explanation Carcinogenicity: BENZO (A) PYRENE:IARC MONO, SUPP, VOL 7, PG
56, 1987:GROUP 2A. NTP 7TH ANNUAL RPT ON CARCINS. 1994:ANTIC TO BE (SUP
DAT)

Signs/Symptoms Of Overexp: SEE HEALTH HAZARDS.

Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.

Emergency/First Aid Proc: EYES:FLUSH WITH COPIOUS AMOUNTS OF WATER FOR AT
LEAST 15 MINUTES. SKIN:FLUSH WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15
MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. INHALATION: REMOVE
TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS
DIFFICULT, GIVE OXYGEN. INGESTION:WASH OUT MOUTH WITH WATER PROVIDED PERSON
IS CONSCIOUS. CALL A PHYSICIAN IMMEDIATELY.

=====

Precautions for Safe Handling and Use

=====

Steps If Matl Released/Spill: EVACUTE AREA. WEAR NIOSH/MSHA APPROVED SCBA,
RUBBER BOOTS AND HEAVY RUBBER GLOVES. WEAR DISPOSABLE COVERALLS AND DISCARD
THEM AFTER USE. SWEEP UP, PLACE IN BAG & HOLD FOR WASTE DISP. VENT AREA &
WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.

Waste Disposal Method: DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE
SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND
SCRUBBER. OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

Precautions-Handling/Storing: DO NOT BREATHE DUST. DO NOT GET IN EYES, ON
SKIN, ON CLOTHING. CARCINOGEN. MUTAGEN. TERATOGEN. KEEP TIGHTLY CLOSED.
STORE IN A COOL, DRY PLACE.

Other Precautions: NONE SPECIFIED BY MANUFACTURER.

=====

Control Measures

=====

Respiratory Protection: WEAR APPROPRIATE NIOSH/MSHA APPROVED RESPIRATOR.

Ventilation: USE ONLY IN A CHEMICAL FUME HOOD.

Protective Gloves: CHEMICAL-RESISTANT GLOVES.

Eye Protection: ANSI APPROVED CHEM WORKERS GOGGS (FP N).

Other Protective Equipment: ANSI APPROVED EMERGENCY EYE WASH AND DELUGE
SHOWER (FP N). OTHER PROTECTIVE CLOTHING.

Work Hygienic Practices: WASH THOROUGHLY AFTER HANDLING.

Suppl. Safety & Health Data: EXPLAN OF CARCIN: CARCINOGEN. ANIMAL:SKIN,
LUNG, LIVER.

=====

Transportation Data

=====

=====

Disposal Data

=====

=====

Label Data

=====

Label Required: YES

Technical Review Date: 23OCT95

Label Status: G

Common Name: BENZO (A) PYRENE, 98%, B1008-0

Chronic Hazard: YES

Signal Word: WARNING!

Acute Health Hazard-Moderate: X

Contact Hazard-Moderate: X

Fire Hazard-Slight: X

Reactivity Hazard-None: X

Special Hazard Precautions: TOXIC. ACUTE:HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. MAY CAUSE EYE IRRITATION. MAY CAUSE SKIN IRRITATION. CHRONIC:CANCER HAZARD. CONTAINS BENZO(A)PYRENE WHICH IS LISTED AS AN ANIMAL LUNG, SKIN AND LIVER CARCINOGEN (FP N). MAY ALTER GENETIC MATERIAL. TERATOGEN. TARGET ORGAN(S):SKIN, LUNGS. TO THE BEST OF MANUFACTURER'S KNOWLEDGE, THE CHEMICAL, PHYSICAL & TOX PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

Protect Eye: Y

Protect Skin: Y

Protect Respiratory: Y

Label Name: ALDRICH CHEMICAL CO INC

Label P.O. Box: 355

Label City: MILWAUKEE

Label State: WI

Label Zip Code: 53201

Label Country: US

Label Emergency Number: 414-273-3850

ALDRICH CHEMICAL -- BENZO (A) PYRENE, 98%, B1008-0
MATERIAL SAFETY DATA SHEET
NSN: 681000N065303
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Ingredient: BENZO(A)PYRENE (CERCLA)
Ingredient Sequence Number: 01
Percent: 98
NIOSH (RTECS) Number: DJ3675000
CAS Number: 50-32-8
OSHA PEL: 0.2 MG/M3
ACGIH TLV: A2

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Physical/Chemical Characteristics
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Appearance And Odor: YELLOW GREEN POWDER.
Boiling Point: 923F, 495C
Melting Point: >351F, >177C

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Fire and Explosion Hazard Data
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Extinguishing Media: WATER SPRAY, CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.
Special Fire Fighting Proc: WEAR NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT (FP N).
Unusual Fire And Expl Hazrds: NONE SPECIFIED BY MANUFACTURER.

=====
Reactivity Data
=====

Stability: YES
Cond To Avoid (Stability): NONE SPECIFIED BY MANUFACTURER.
Materials To Avoid: OXIDIZING AGENTS.
Hazardous Decomp Products: CARBON MONOXIDE, CARBON DIOXIDE.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT

=====
Health Hazard Data
=====

LD50-LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES

Route Of Entry - Ingestion: YES

Health Haz Acute And Chronic: ACUTE:HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. MAY CAUSE EYE IRRITATION. MAY CAUSE SKIN IRRITATION. SKIN LUNGS. TO THE BEST OF MANUFACTURER'S KNOWLEDGE, THE CHEMICAL, PHYSICAL & TOX PROPERTIES HAVE NOT BEEN THORO INVESTIGATED.

Carcinogenicity - NTP: YES

Carcinogenicity - IARC: YES

Carcinogenicity - OSHA: NO

Explanation Carcinogenicity: BENZO (A) PYRENE:IARC MONO, SUPP, VOL 7, PG 56, 1987:GROUP 2A. NTP 7TH ANNUAL RPT ON CARCINS. 1994:ANTIC TO BE (SUP DAT)

Signs/Symptoms Of Overexp: SEE HEALTH HAZARDS.

Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.

Emergency/First Aid Proc: EYES:FLUSH WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES. SKIN:FLUSH WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. INHALATION: REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. INGESTION:WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS. CALL A PHYSICIAN IMMEDIATELY.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: EVACUTE AREA. WEAR NIOSH/MSHA APPROVED SCBA, RUBBER BOOTS AND HEAVY RUBBER GLOVES. WEAR DISPOSABLE COVERALLS AND DISCARD THEM AFTER USE. SWEEP UP, PLACE IN BAG & HOLD FOR WASTE DISP. VENT AREA & WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.

Waste Disposal Method: DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER. OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

Precautions-Handling/Storing: DO NOT BREATHE DUST. DO NOT GET IN EYES, ON SKIN, ON CLOTHING. CARCINOGEN. MUTAGEN. TERATOGEN. KEEP TIGHTLY CLOSED. STORE IN A COOL, DRY PLACE.

Other Precautions: NONE SPECIFIED BY MANUFACTURER.

Control Measures

Respiratory Protection: WEAR APPROPRIATE NIOSH/MSHA APPROVED RESPIRATOR.

Ventilation: USE ONLY IN A CHEMICAL FUME HOOD.

Protective Gloves: CHEMICAL-RESISTANT GLOVES.

Eye Protection: ANSI APPROVED CHEM WORKERS GOGGS (FP N).

Other Protective Equipment: ANSI APPROVED EMERGENCY EYE WASH AND DELUGE SHOWER (FP N). OTHER PROTECTIVE CLOTHING.

Work Hygienic Practices: WASH THOROUGHLY AFTER HANDLING.

Suppl. Safety & Health Data: EXPLAN OF CARCIN: CARCINOGEN. ANIMAL:SKIN, LUNG, LIVER.

Transportation Data

Disposal Data

Label Data

Label Required: YES

Technical Review Date: 23OCT95

Label Status: G

Common Name: BENZO (A) PYRENE, 98%, B1008-0

Chronic Hazard: YES

Signal Word: WARNING!

Acute Health Hazard-Moderate: X

Contact Hazard-Moderate: X

Fire Hazard-Slight: X

Reactivity Hazard-None: X

Special Hazard Precautions: TOXIC. ACUTE:HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. MAY CAUSE EYE IRRITATION. MAY CAUSE SKIN IRRITATION. CHRONIC:CANCER HAZARD. CONTAINS BENZO(A)PYRENE WHICH IS LISTED AS AN ANIMAL LUNG, SKIN AND LIVER CARCINOGEN (FP N). MAY ALTER GENETIC MATERIAL. TERATOGEN. TARGET ORGAN(S):SKIN, LUNGS. TO THE BEST OF MANUFACTURER'S KNOWLEDGE, THE CHEMICAL, PHYSICAL & TOX PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

Protect Eye: Y

Protect Skin: Y

Protect Respiratory: Y

Label Name: ALDRICH CHEMICAL CO INC

Label P.O. Box: 355

Label City: MILWAUKEE

Label State: WI

Label Zip Code: 53201

Label Country: US

Label Emergency Number: 414-273-3850

Hetrick, William

From: Comstock, Charles R
Sent: Wednesday, July 26, 2000 12:17 PM
To: Quick, Polly; Hetrick, William; VonBurg, Rudolph
Cc: Ogawa, Jeffrey A
Subject: RE: H & S OFFICER OUT AT DUGWAY

polly
projected h&s officer needs for my work in august will be for the week of 8/7 (4-10s) and 2 days for JMcguire the week of 8/14. this my flip flop a bit, but i will know today. also, the current word from the base is that in non-CWM environments personnel don't need the chem training, blood tests or masks (the above sites fall into that category).
projected for the first week in sept, my projects will need tincknell for at least two months at hwmu's 33 and 36 (these are non-CWM remediation projects), with hwmu 42 as a buffer to keep work moving.
Then the groundwater investigations should start at hwmu 36, 37, 38, and 55 (with only 55 being a CWM environment). If sequential, this work could take up to 3 months.
so i am sure that we can keep bruce busy.
chuck

-----Original Message-----

From: Quick, Polly
Sent: Tuesday, July 25, 2000 3:26 PM
To: Hetrick, William; VonBurg, Rudolph; Comstock, Charles R
Cc: Ogawa, Jeffrey A
Subject: RE: H & S OFFICER OUT AT DUGWAY
Importance: High

Bill, since Rudy is out for two weeks, I need to ask your help now with the following:

- having someone available for the August Dugway work (which, as Rudy's memo indicates, is intermittent): talk with Chuck Comstock about the specific needs - he will be in the office Wed. (tomorrow) x 2064

-someone who can spend the last week in August at Rocketdyne transitioning with Bruce Ticknell so Bruce can go to Dugway: we need to coordinate with Dan Bushnell at the site and John McMillan here about that transition

I believe we are ready to make Bruce the Dugway HSO, with the understanding that there will be times when we are not in the field when we will ask your group to find short term assignments for him. [JEFF - CORRECT ME IF THIS IS WRONG]

Rudy did not make us aware that he needed to go through the HS network to find people - I believe we had talked with the Alaska person on our own (in conjunction with discussions about other work) and then recommended him to Rudy. In the future, we'll try to make it possible for Rudy to work the system as IT requires.

How often do you update your schedule and assignments for HSOs? Weekly, biweekly? We will be sure our PMs update Rudy on schedule changes so that you can help "protect" people like Bruce for us with short term assignments when the long term work gets postponed as it did in this case.

I'm encouraged to hear from you that there are body shops from whom we may be able to get HS people to meet short term needs. However, Dugway is tough because of the required blood tests and training - we want to minimize the number of new people we use, one of the reasons Rudy was biased in favor of Londell. However, we have advised Rudy that we need someone other than Londell for long term Dugway work.

Polly

-----Original Message-----

From: Hetrick, William
Sent: Friday, July 21, 2000 6:24 PM
To: VonBurg, Rudolph; Quick, Polly; Ogawa, Jeffrey A; Comstock, Charles R
Cc: Houseman, Warren; Stout, Louis E
Subject: RE: H & S OFFICER OUT AT DUGWAY

I think we need to have a meeting so that there is a clear understanding of how H & S Officers are assigned to projects. Apparently Rudy is gone on vacation but for the record and for better planning in the future, I'd like to offer the following for your guidance:

1. I cannot, nor can the HSO's, wait to be called to the table. Londell is already assigned to work on a project in Santa Maria, having finished work at China Lake today. Rudy, you know that it is important to keep me posted on the scheduling of TERC projects in order to provide a reasonable time frame to plan placement of an HSO. I appreciate your support for Londell but he is already assigned. Your last memo on 7/5 addressed our agreed assignment of him to Dugway and had him scheduled to report there on 7/24. That apparently fell through sometime this week. What assurance is there that Londell will be utilized in two weeks? Will TERC cover his salary for the interim time he is waiting to be called up? If there is no employment opening for him in August and if

there another delay in work at Dugway, will TERC pay his salary until an opportunity surfaces?

2. I do not know why Darren (out of Alaska) is being contacted. He is not in my functional H & S Group (he is assigned to the Emergency Response Group). Again, Rudy, if you are going to contact H & S support personnel for TERC projects, contact me first. If we do not have personnel in our group available, I will help you look outside of it. This is not the first time this has happened and it will only make providing support for your projects more difficult.

3. Bruce is the best candidate for work at Dugway and he has been at the top of my roster for full time assignment there whenever possible. Keep in mind, Rudy, that because he is a member of the UXO Group he is not available because you choose him. The cross support of UXO and H&S personnel is an arrangement that has grown favorably between our two disciplines but which has happened because of agreed upon commitments and mutual planning. I also want to note that Bruce was assigned to Rocketdyne after having sat on the bench for more than several weeks due to delays in starting work at Dugway. Similar to Londell, Bruce had to cancel air travel reservations when last minute plans cancelled work at Dugway. I do not think it is appropriate to have the same situation occur again and further impact his earnings. It should also be clear that the presumption of switching out Londell for Bruce is workable but is not something I will agree to unless there is better communication and planning on these assignments.

If there is no intent to bring on a full time H & S officer for the Dugway program (and my unsolicited opinion is that it is time to do so), we will need to be flexible. I'll be glad to help in any way possible to support the Program needs and perhaps a brief meeting would help us outline how best to proceed. Let me know your thoughts.

-----Original Message-----

From: VonBurg, Rudolph
Sent: Friday, July 21, 2000 3:56 PM
To: Quick, Polly; Ogawa, Jeffrey A; Comstock, Charles R; Allen, Londell
Cc: Hetrick, William
Subject: H & S OFFICER OUT AT DUGWAY

It appears that the earliest we are going to be out at Dugway is August 7th. The project anticipated is well drilling and sewer investigation. The total work should only take a few days and a complete week is not anticipated. The week of the 14th, there will be some activity that may complete the week. These are all non UXO/CWM events. I therefore propose Londell to cover these events because he is available, experienced, already trained (self aid and cholinesterase), capable of handling these types of events and based in Oakland. He is therefore a better candidate than Darren (out of Alaska).

Bruce Tincknell will join Dugway at the end of August. If necessary Londell can be switch to Rocketdyne at the end of August because, according to John McMillan, the Rocketdyne project will be winding down and will have less exhausting activity associated with it.

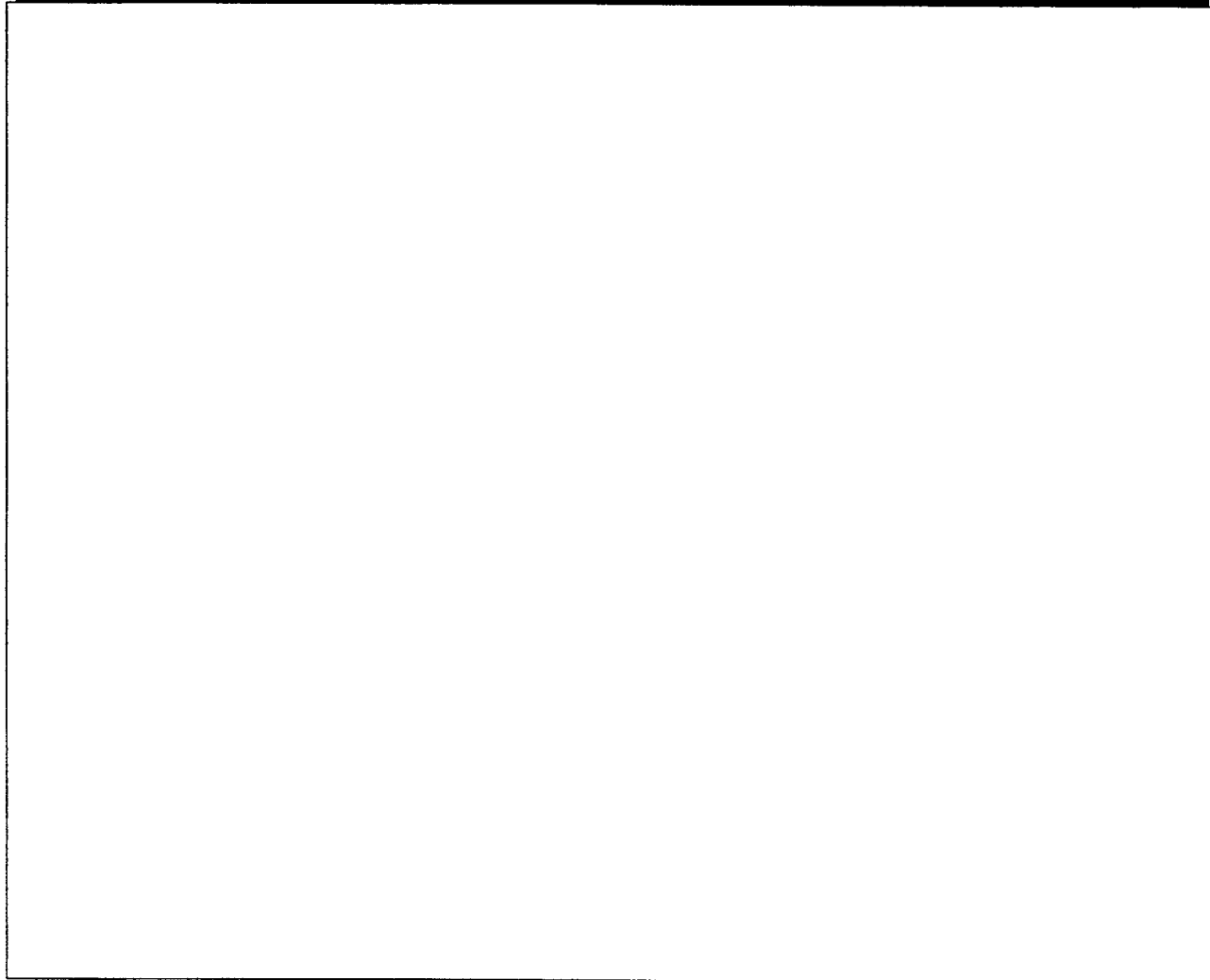
ATTACHMENT 5
HEALTH AND SAFETY CHECKLIST

Health and Safety Checklist

- | | |
|--|--|
| <input type="checkbox"/> First aid kits (one per vehicle and facility) | <input type="checkbox"/> Detector tubes |
| <input type="checkbox"/> Fire extinguishers (one per vehicle and facility) | <input type="checkbox"/> Methane calibration gas |
| <input type="checkbox"/> Safety glasses or goggles, ANSI approved | <input type="checkbox"/> Isobutylene calibration gas |
| <input type="checkbox"/> Hard hats, ANSI approved | <input type="checkbox"/> Tedlar bags |
| <input type="checkbox"/> Ear plugs, 25 dBA or greater | <input type="checkbox"/> Brushes |
| <input type="checkbox"/> Under gloves (latex, Nitrile) | <input type="checkbox"/> Hand/face wash station |
| <input type="checkbox"/> Impermeable gloves | <input type="checkbox"/> Paper towels |
| <input type="checkbox"/> Work gloves | <input type="checkbox"/> Complete Health and Safety Plan |
| <input type="checkbox"/> Steel-toed work boots, ANSI approved | <input type="checkbox"/> MSDSs |
| <input type="checkbox"/> Tyvek suits (sizes XXL – XXXXL) | <input type="checkbox"/> Rubber boots/boot covers |
| <input type="checkbox"/> Duct tape | <input type="checkbox"/> Sun block |
| <input type="checkbox"/> Trash bags | <input type="checkbox"/> Shade |
| <input type="checkbox"/> Eyewash | <input type="checkbox"/> Air horn |
| <input type="checkbox"/> Emergency shower | <input type="checkbox"/> Noise Dosimeter/sound level meter with calibrator |
| <input type="checkbox"/> Portable toilet | <input type="checkbox"/> Traffic control signs |
| <input type="checkbox"/> Drinking water and disposable cups | <input type="checkbox"/> Traffic control vests |
| <input type="checkbox"/> Gatoraid/electrolyte replacement | <input type="checkbox"/> Wet Bulb Globe Thermometer (WBGT) |
| <input type="checkbox"/> Air-purifying respirators (full-face/half-face) | <input type="checkbox"/> Barricades with lights |
| <input type="checkbox"/> Organic vapor P100 cartridges, NIOSH approved | <input type="checkbox"/> Traffic cones |
| <input type="checkbox"/> Thermometer | <input type="checkbox"/> Scrub suits |
| <input type="checkbox"/> Barricade tape (yellow and red) | <input type="checkbox"/> Towels |
| <input type="checkbox"/> O ₂ LEL meter with CO/SO ₂ /H ₂ S sensor options | <input type="checkbox"/> Laundry service and letter to service |
| <input type="checkbox"/> Photoionization detector (PID) | <input type="checkbox"/> Pulse rate meter |
| <input type="checkbox"/> Miniram aerosol monitor | <input type="checkbox"/> Air flow calibrator |
| <input type="checkbox"/> Decon tubs | <input type="checkbox"/> PVC raingear |
| <input type="checkbox"/> Personal sampling pump | <input type="checkbox"/> Wire mesh face shield |
| <input type="checkbox"/> Charcoal tubes | <input type="checkbox"/> Ear muffs/ear plugs |
| <input type="checkbox"/> Filter cassettes | <input type="checkbox"/> EZ evaluation route maps |

ATTACHMENT 6
EXCLUSION ZONE EVACUATION MAP

EXCLUSION ZONE EVACUATION MAP



- EZ : Exclusion Zone
- CRZ : Contaminant Reduction Zone
- SZ : Support Zone
-) (: Entry/Exit
- ⇒ : Evacuation Route
- X : Primary Meeting Location
- SE : Safety Equipment (fire extinguisher, first aid kit, eyewash, shower)
- < : Wind Direction